CITY MULTI®
CONTROLLER

1. MITSUBISHI ELECTRIC'S AIR-CONDITIONER NETWORK SYSTEM (MELANS) CNTR-2
   1-1. Function table of controllers CNTR-3
2. LOCAL REMOTE CONTROLLER CNTR-4
   2-1. Deluxe MA remote controller [PAR-21MAA] CNTR-4
   2-2. ME remote controller [PAR-F27MEA-US] CNTR-5
   2-3. Simple MA remote controller [PAC-YT51CRB] CNTR-6
   2-4. Wireless remote controller [PAR-FL32MA / PAR-FA32MA] CNTR-7
   2-5. LOSSNAY M-NET remote controller [PZ-52SF] CNTR-8
3. SYSTEM CONTROLLER CNTR-9
   3-1. System group controller [PAC-SF44SRA] CNTR-9
   3-2. Schedule timer [PAC-YT34STA] CNTR-11
   3-3. ON/OFF controller [PAC-YT40ANRA] CNTR-13
   3-4. Central controller [G-50A] CNTR-15
   3-5. Central controller [GB-50A] CNTR-22
   3-6. Power supply unit [PAC-SC50KUA] CNTR-29
   3-7. Integrated system software [TG-2000A] CNTR-32
   3-8. Electric amount count software [PAC-YG11CDA] CNTR-36
   3-9. PLC software for general equipment [PAC-YG21CDA] CNTR-37
   3-10. BACnet® interface [PAC-YG31CDA] CNTR-38
   3-11. PLC software for demand input [PAC-YG41CDA] CNTR-39
   3-12. LonWorks® interface [LMAP03U] CNTR-41
   3-13. DIDO Controller [PAC-YG66DCA] CNTR-43
   3-14. AI Controller [PAC-YG63MCA] CNTR-48
4. SYSTEM COMPONENT CNTR-53
   4-1. Outdoor unit/Water-source unit input/output connector CNTR-56
   4-2. Indoor unit "-E" type input/output connector CNTR-58

CONTROLLER

MITSUBISHI ELECTRIC's Air-conditioner Network System (MELANS)

MELANS

MELANS has a large line-up, including local remote controllers, timers, group controllers, central controllers, integrated system software, PLC and its software, as well as BMS interface hardware and software. The combination of the MELANS products can fulfill the requirements of small-scaled control system, middle-scaled control system up to 2,000 indoor units, and/or large-scaled open systems affiliated with a BMS system. Moreover, with central controller G-50A/GB-50A, PC browser and remote access (monitoring and operating) via communication network is possible and easy.

M-NET

Local Remote Controller

All of the local remote controllers feature liquid crystal LED displays and are easy to operate.

Remote Controller
PAR-F27MEA-US
PAR-21MAA

Simple Remote Controller
PAC-YT51CRB

Wireless Remote Controller
PAR-FA32MA
PAR-FL32MA

Central Remote Controller

System Group Controller
PAC-SF44SRA

Schedule Timer
PAC-YT34STA

ON/OFF Controller
PAC-YT40ANRA

G-50A

GB-50A

CITY MULTI®

■OUTDOOR UNIT
- Y :PUHY
- R2 :PURY
- WY :PQHY
- WR2:PQRY
- S :PUMY

■INDOOR UNIT
- PEFY-P-NMLU-E
- PEFY-P-NMHU-E
- PDFY-P-NMU-E
- PMFY-P-NBMU-E
- PLFY-P-NCMU-E
- PLFY-P-NBMU-E
- PCFY-P-NGMU-E
- PKFY-P-NAMU-E
- PKFY-P-NGMU-E
- PKFY-P-NFMU-E
- PFFY-P-NEMU-E
- PFFY-P-NRMU-E

Interface
LMAP03U

LonWorks® transmission line

BACnet® interface software
PAC-YG31CDA (SW-BACnet)

BACnet® transmission line

MITSUBISHI ELECTRIC's CITY MULTI® can be easily connected to the building management system through BACnet®.

BUILDING MANAGEMENT SYSTEM

Ethernet

Air-Conditioning Control System

This is a middle-scaled air conditioning management system, in which up to 2,000 indoor units can be centrally controlled

Integrated system control software TG-2000A

1-1. Function table of controllers

Model	Local remote controller			System controller							
	PAR-21MAA	PAR-F27MEA	PAC-YT51CRB	PAC-YT40ANRA	PAC-SF44SRA	PAC-YT34STA	G-50A		GB-50A		TG-2000A
Controllable Groups/Indoors (Group / Indoor)	1 / 16	1 / 16	1 / 16	16 / 50	50 / 50	50 / 50	50 / 50		50 / 50		2000 / 2000
							G-50A	Browser	GB-50A	Browser	
■Operating											
ON/OFF	○	○	○	◎	◎	◎	◎	◎	▲	◎	◎
Mode(cool/heat/dry/fan)	○	○	○	N	◎	N	◎	◎	N	◎	◎
Temperature-set	○	○	○	N	◎	N	◎	◎	N	◎	◎
Local Permit-Prohibit	N	N	N	N	◎	◎	◎	◎	N	◎	◎
Fan speed	○	○	○	N	◎	N	◎	◎	N	◎	◎
Air-flow direction	○	○	N	N	◎	N	◎	◎	N	◎	◎
■Status monitoring											
ON/OFF	○	○	○	◎	◎	◎	◎	○	▲	○	○ ■
Mode(cool/heat/dry/fan)	○	○	○	N	○	N	○	○	N	○	○
Temperature-set	○	○	○	N	○	N	○	○	N	○	○
Local Permit / Prohibit	○	○	○	○	○	○	○	○	N	○	○
Fan speed	○	○	○	N	○	N	○	○	N	○	○
Air flow direction	○	○	N	N	○	N	○	○	N	○	○
Indoor temperature	○	○	N	N	N	N	○	○	N	○	○
Filter sign	○	○	N	N	○	N	○	○	N	○	○
Error flashing	○	○	○	○	○	○	○	○	▲	○	○ ■
Error code	○	○	○	○	○	○	○	○	N	○	○
Operation hour	N	N	N	N	N	N	N	N	N	N	●
■Timer Operation											
One-day	○	○	N	N	N	N	N	●	N	●	●
Times of ON/OFF per day	8	1/1	N	N	N	16	3/3	12	N	12	12
Weekly	○	N	N	N	N	○	○	●	N	●	●
Times of ON/OFF per week	8x7	N	N	N	N	16x7	21/21	12x7	N	12x7	12x7
Annual	N	N	N	N	N	N	N	●	N	●	●
Auto-off timer	○	○	N	N	N	N	N	N	N	N	N
Min. timer setting unit (minute)	1	10	N	N	N	5	10	1	N	1	1
■Recording											
Error record	N	N	N	N	○	N	○	○	N	○	○
Daily/monthly report	N	N	N	N	N	N	N	N	N	N	◎
Electricity charge	N	N	N	N	N	N	N	N	N	N	●
■Other											
Temperature-set limitation	○	○	○	N	△	N	N	○*2	N	○*2	○
Auto-lock	○	○	N	N	N	N	N	N	N	N	N
■Management (Group/Interlocked)											
Ventilation interlock	N/○	N/○	N/○	○	○	○	○	○/○*2	N	○/○*2	○/○
Group setting	○*1	○	○*1	○	○	○	○	○*2	N	○*2	○
Block setting	N	N	N	N	N	N	N	○*2	N	○*2	○
Revision of electricity charge	N	N	N	N	N	N	N	N	N	N	□●
■Operating on LOSSNAY interlocked (Group/Interlocked)											
ON/OFF	N/○	N/○	N/○	◎/◎*3	◎/◎	◎/◎	◎/◎	◎/◎	▲/▲	◎/◎	◎/◎
Fan speed	N/○	N/○	N	N	◎/◎	N	◎/◎	◎/◎	N/N	◎/◎	◎/◎
Ventilation mode	N/N	N	N	N	◎/N	N	◎/N	◎/N	N/N	◎/N	○/N
■Status monitoring on LOSSNAY interlocked (Group/Interlocked)											
ON/OFF	N/○	N/○	N/○	N	○/○	○/○	◎/◎	◎/◎	▲/▲	◎/◎	◎/○
Fan speed	N/○	N/○	N	N	○/○	N	○/○	○/○	N/N	○/○	○/○
Ventilation mode	N	N	N	N	○/N	N	○/N	○/N	N/N	○/N	○/N

◎: Each group / Batched; ○: Each group; □: Block (for CITY MULTI® Indoor unit, not for all Mr.SLIM); ●: G-50A license registration possible.
N: Not Available; △: Batched only; ▲: Batched handling (for maintenance) ■: Block

*1. Group setting via wiring between Indoor units with cross-over cable;
*2. Installation possible at Initial setting web browser;
*3. Inter-lock is set at Local remote controller.

LOSSNAY remote controller PZ-52SF	
■Controllable LOSSNAY Groups	1
■Controllable LOSSNAY unit	16
■Operating	
ON/OFF	○
Mode (automatic ventilation/vent-heat interchange/normal ventilation)	○
Local Permit-Prohibit	N
Fan speed	○
Air flow direction	N
■Scheduling	N
■Recording	N
■Management	○
Group setting	
Block setting	N

○ : Each group, N: Not Available

■Status monitoring	
ON/OFF	○
Mode (automatic ventilation/vent-heat interchange/normal ventilation)	○
Local Permit-Prohibit	○
Fan speed	○
Air flow direction	N
Filter sign	○
Error flashing	○
Error code	○

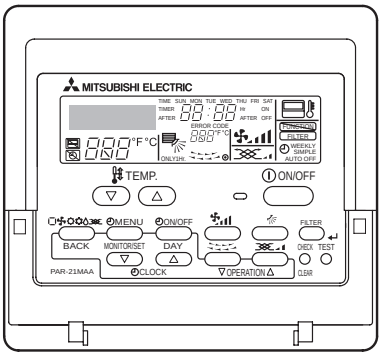
Air conditioner control system interface

LMAP03U: LonWorks® Interface
Controls up to 50 Groups/ 50 Indoor,
Details refer to its description.

PAC-YG31CDA: BACnet® Interface Software (SW-BACnet)
Controls up to 500 Groups/ 500 Indoor,
For details, see its description.

2. Local remote controller

2-1. Deluxe MA remote controller [PAR-21MAA]



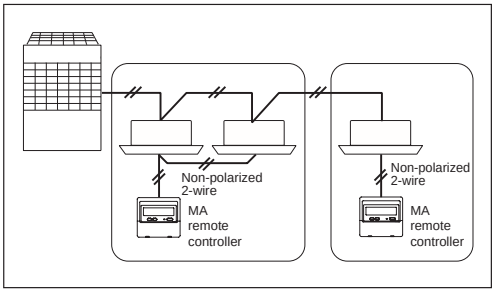
- High-quality white color body and light-green display.
- Dot liquid-crystal display is applied.
  Choose from Japanese, Chinese, English, Germany, Spanish, Russian, Italian, French displays.
- Connectable to all CITY MULTI® indoor unit, and automatically adjust its function with the indoor unit connected.
- Limiting temperature setting range is possible.
  Help to avoid over-cooling or over-heating. Save energy.
- Auto-stop timer is available.
  Help to avoid forgetting to stop the air conditioner.
- Weekly timer is available.
  ON/OFF/Temperature setting 8 times per day, 1 week scheduling.
- Grouping via cross-over wire directly.
- Usable as the local remote controller for system controller (MELANS)
  * Combining ME remote controller and/or LOSSNAY remote controller in a group is not possible.

■ Functions

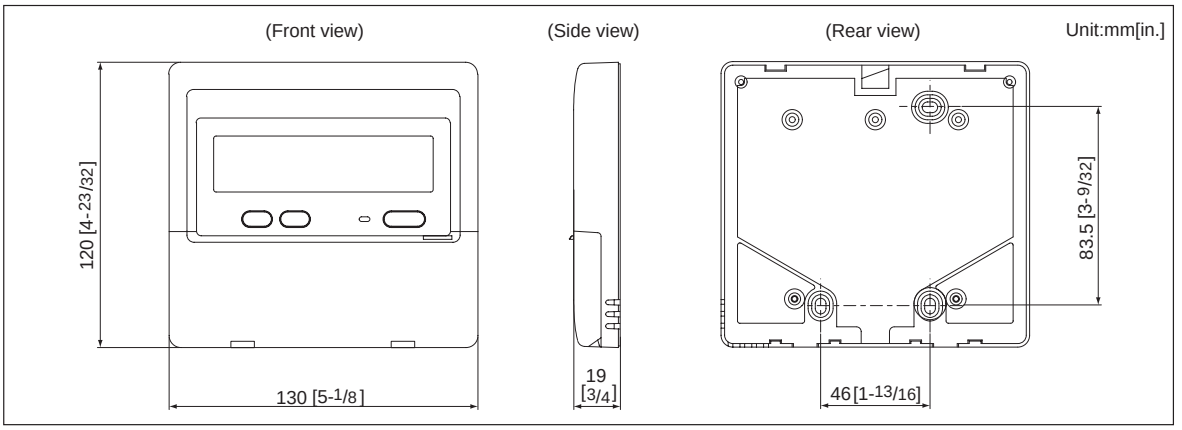
□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) For PDFY/PEFY/PFFY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, Louver ON/OFF Air flow direction settings vary depending on the model.	○	○
Weekly Timer	ON/OFF/Temperature setting can be done up to 8 times one day in the week. The time can be set by the minute.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: When the local remote controller inactivation command is received from the master system controller, "🖃" is displayed.	×	※1 ○
Prohibition/permission of specified mode (Cooling prohibited /heating prohibited /cooling-heating prohibited)	By the setting from System Controller, the operation for the following modes is prohibited. At cooling prohibited : Cool, Dry, Auto, At heating prohibited : Heat, Auto, At cooling-heating prohibited : Cool, Heat, Dry, Auto	×	○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	×	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	×	□
Test run	This operates air conditioner units in test run mode.	○	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY. LOSSNAY items that can be set are "Hi" "Low" "Stop". Ventilation mode switching is not available.	○	○
Function to limit the setting range of room temperature (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting.The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating.	○	○
Easy-to-operate simplified locking function (Auto lock function)	Setting/releasing of simplified locking for remote control switch can be performed. · Locking of all switches · Locking of all switches except Start/Stop switch	○	○

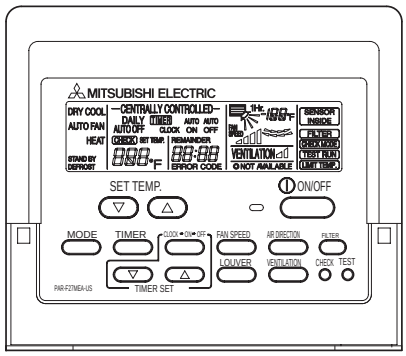
■ System example



■ External dimension



2-2. ME remote controller [PAR-F27MEA-US]



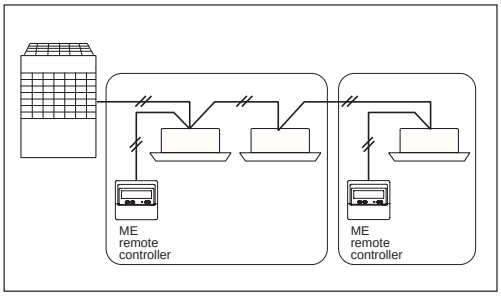
- Three timer modes are available with its enhanced timer function.
- The room temperature can be limited by the initial setting. By setting the room temperature range narrower than usual setting, cooling/heating operation with excessive temperature can be prevented and thus save energy.
- Allows for simple “button locking” function.

■ Functions

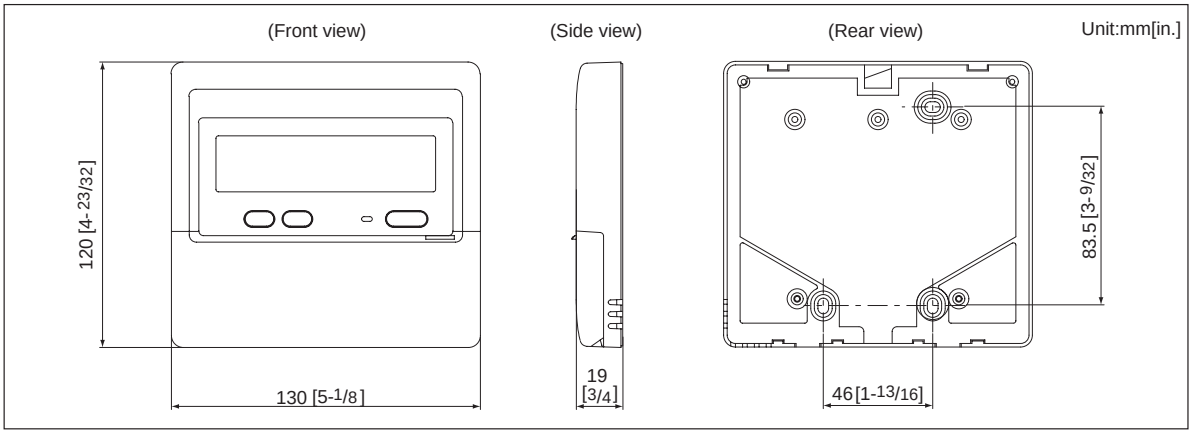
□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
DRY COOL AUTO FAN HEAT Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
SET TEMP. Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) For PDFY/PEFY/PFFY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, Louver ON/OFF Air flow direction settings vary depending on the model.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: When the local remote controller inactivation command is received from the master system controller, "-CENTRALLY CONTROLLED -" is displayed.	×	※1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	×	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	×	□
Timer operation	Thanks to the three timer modes equipped, a proper mode can be selected to meet the usage. One day timer : ON/OFF setting of one time on one day can be applied. Daily timer : ON/OFF setting by the One day timer can be repeated for everyday. Auto OFF timer : OFF timer can be set in a range from 30 minutes to 4 hours. ※Setting of Auto OFF timer automatically activates OFF timer at the next operation. This function can be utilized to prevent the negligence of OFF setting. ※Weekly schedule in only one patterns can be employed by connecting Program timer.※2	○	○
Test run	This operates air conditioner units in test run mode.	○	○
Function to limit the setting range of room temperature (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting.The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating. ※When making the function to limit room temperature setting range effective, the operation mode cannot be set to the auto mode.	○	○
Easy-to-operate simplified locking function (Auto lock function)	Setting/releasing of simplified locking for remote control switch can be performed. · Locking of all switches · Locking of all switches except Start/Stop switch	○	○

■ System example

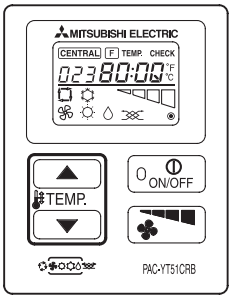


■ External dimension



CONTROLLER

2-3. Simple MA remote controller [PAC-YT51CRB]



- Control: START/STOP, room temperature, fan speed, and operation mode selection
- The only wiring required is cross-over wiring based on two-wire signal lines.
- Room temperature sensor is built in
- LCD temperature setting and display in 1°C /1°F unit.
- Set temperature range limit
- Can operate all types of indoor units

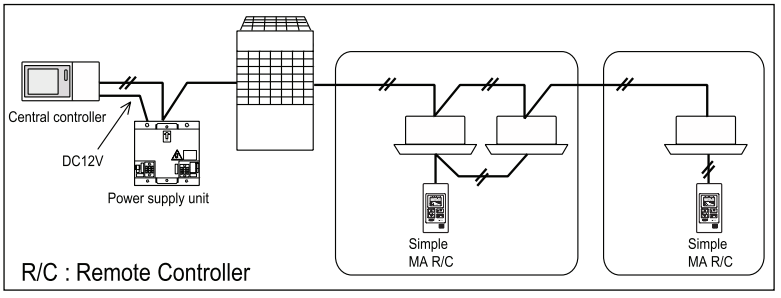
  ※: If additional features are needed beyond Simple MA PAC-YT51CRB capabilities, use it in conjunction with Deluxe MA PAR-21MAA or Central Controllers G-50A or GB-50A.
  Using Simple MA PAC-YT51CRB in combination with PAR-F27MEA-US M-NET Remote Controller is not permitted inside a group.
- Dimensions: 2-3/4 (W) x 4-3/4 (H) x 1-5/8 (D) in.

■ Functions

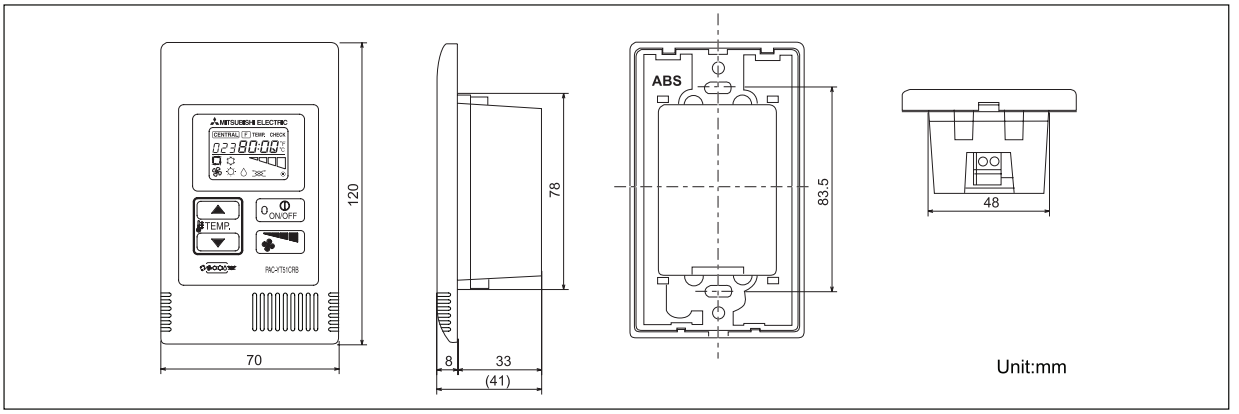
□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. Operation modes vary depending on the air conditioner unit. Auto mode is the CITY MULTI® R2- and WR2-Series only.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) For PDFY/PEFY/PFFY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low Fan speed setting varies depending on the model.	○	○
Air flow direction setting	Air flow direction angles (4-angle, Swing) Louver ON/OFF Air flow direction settings vary depending on the model.	×	×
Timer operation	Not available	×	×
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Set temperature). ※1: When the local remote controller inactivation command is received from the master system controller, "CENTRAL" is displayed.	×	※1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	×
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed.	×	□
Test run	This operates air conditioner units in test run mode. ※2: The display for test run mode will be the same as for normal start/stop (no display "test run").	○	※2 ○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY. ※3: The interlocked LOSSNAY will be enabled when the indoor unit(s) are enabled. LOSSNAY ON/OFF status is displayed on the Simple MA PAC-YT51CRB. Fan speed and ventilation mode switching are not available through the Simple MA.	※3 ○	※3 ○
Function to limit the setting range of room temp. (Set temperature range limit)	The range of room temperature setting can be limited by the initial setting.The lowest limit temperature can be made higher than the usual (67°F/19°C) at cooling/drying, while the upper limit temperature lower than the usual (83°F/28°C) at heating.	○	○
Prohibition/permission of specified mode /heating prohibited /cooling-heating prohibited)	By the setting from System Controller, the operation for the following modes is prohibited. At cooling prohibited : Cool, Dry, Auto, At heating prohibited : Heat, Auto, At cooling-heating prohibited : Cool, Heat, Dry, Auto	×	○

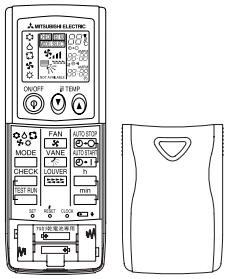
■ System example



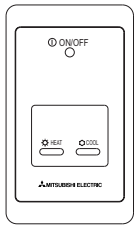
■ External dimension



2-4. Wireless remote controller [PAR-FL32MA / PAR-FA32MA]



PAR-FL32MA



PAR-FA32MA
(Signal receiving unit)

- It can operate in a group system without requiring address settings.
- When operating, it displays LED lamps. When errors occur, the error code can be shown by the LED flash count.

※: If an indoor unit with different functionality is operating inside the same group, please note there may be cases when functionality is partially disabled for batch control.

※: Wireless remote controllers can only be used for a single refrigerant system.

※: If you use a system controller to centrally control a group, you will need cross-wiring between indoor units when using a wireless remote controller.
Also ensure there is no difference between the group setting of the main system controller and the cross wiring across indoor units when wiring and setting cross wires.

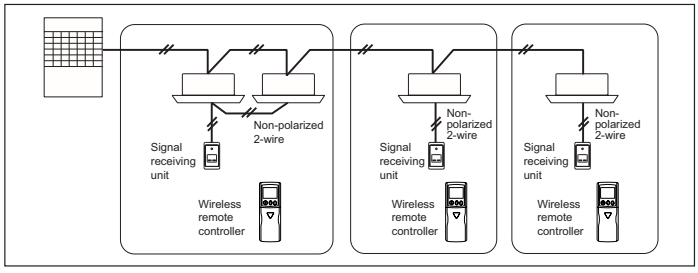
■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a single group	○	○
Operation mode switching	Switches between Cool / Dry / Fan / Heat / Auto . Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2- and WR2-Series.	○	○
Temperature setting	Sets the temperature for a single group Range of temperature setting Cool/Dry : 67°F - 87°F / 19°C - 30°C Heat : 63°F - 83°F / 17°C - 28°C Auto : 67°F - 83°F / 19°C - 28°C	○	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 2 air flow speed settings: Hi/Low	※	※
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing. Air flow direction settings vary depending on the model.	※	※
Timer operation	One ON/OFF setting can be set for one day.	○	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※1: If operation is performed when the local remote controller inactivation command is received from the main system controller, a buzzer will ring and an LED will flash.	×	※1 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit when the indoor unit is operating.	×	×
Error	When an error occurs on the air conditioner unit, the operation lamp on the signal receiving unit will flash.	×	○
Test run	This operates air conditioner units in test run mode.	○	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY.	×	×

※ Some models will have different display for the air flowdirection and fan speed. Set the air flow direction and fan speed when performing initial setting.

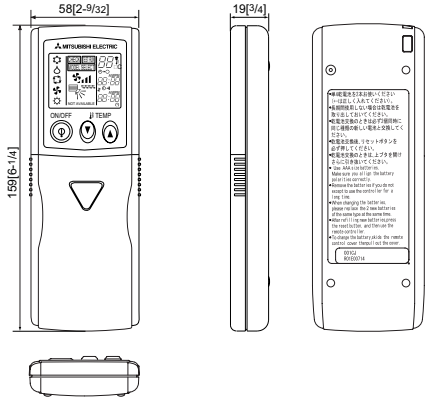
■ System example



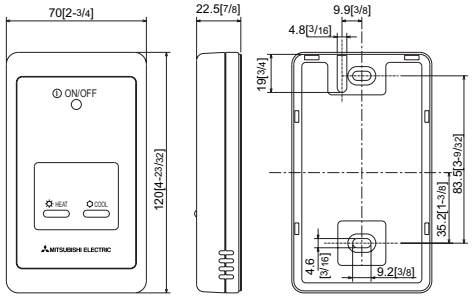
■ External dimension

Unit:mm[in.]

PAR-FL32MA

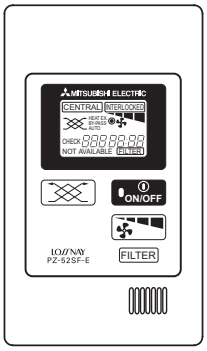


PAR-FA32MA



CONTROLLER

2-5. LOSSNAY M-NET remote controller [PZ-52SF]



- Stand-alone LOSSNAY operation is possible by commands from a central controller or LOSSNAY remote controller. (G-50A/GB-50A is a central controller that supports LOSSNAY operation.)
- The LOSSNAY remote controller is capable of changing the air flow and vent modes.
- All the wiring is cross-wiring that uses non-polar two wire system signal cables.

※ : When setting up a LOSSNAY stand-alone system or when setting up a LOSSNAY and central controller system, connect a power supply unit for the signal cables.

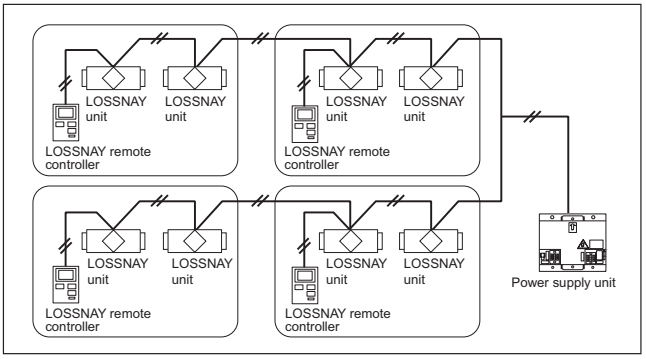
※ : It is impossible to use a LOSSNAY remote controller for LOSSNAY unit that is interlocked other indoor unit (except for some models).

■ Functions

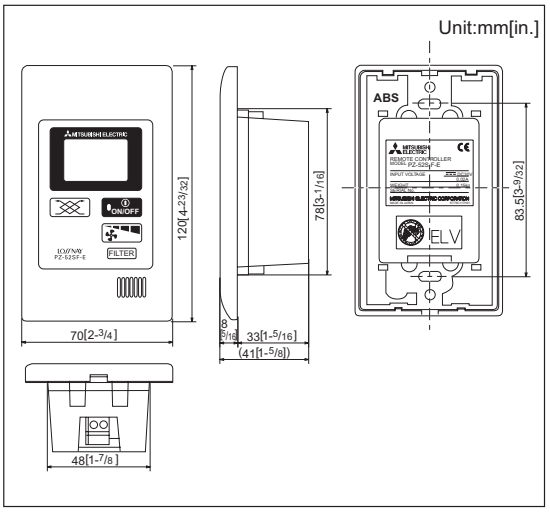
□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for a LOSSNAY unit	○	○
Operation mode switching	Switches between automatic ventilation/ vent - heat interchange/ normal ventilation Note: Operation modes vary depending on the model. When connecting to only models without a damper, these models cannot be used.("NOT AVAILABLE" will appear in the display.)	○	○
Temperature setting	Not available	×	×
Fan speed setting	Models with 2 air flow speed settings: Hi/Low When only connected to single notch models, this function is disabled.	○	○
Air flow direction setting	Not available	×	×
Timer operation	Not available	×	×
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Reset filter). ※1: When the local remote controller inactivation command is received from a master system controller, " CENTRAL " is displayed.	×	※1 ○
Indoor unit intake temperature	Not available	×	×
Error	When an error occurs on the air conditioner unit, the operation lamp on the signal receiving unit will flash.	×	□
Test run	There is no test run switch for LOSSNAY remote controllers. Set test run on a LOSSNAY by using the test run switch on the LOSSNAY unit. ※2: Cancel by operating the start/stop switch after switching off the LOSSNAY unit test run switch.	※2 ×	○
Ventilation equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY.	○	○
Interlocked operation	This is displayed to indicate it is being operated by an operation control unit's external control terminal for an interlocked system that contains LOSSNAY units and indoor units.	×	○

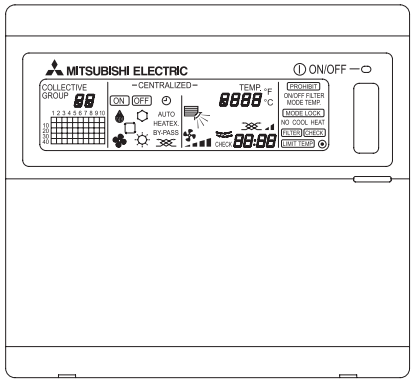
■ System example



■ External dimension



3-1. System group controller [PAC-SF44SRA]



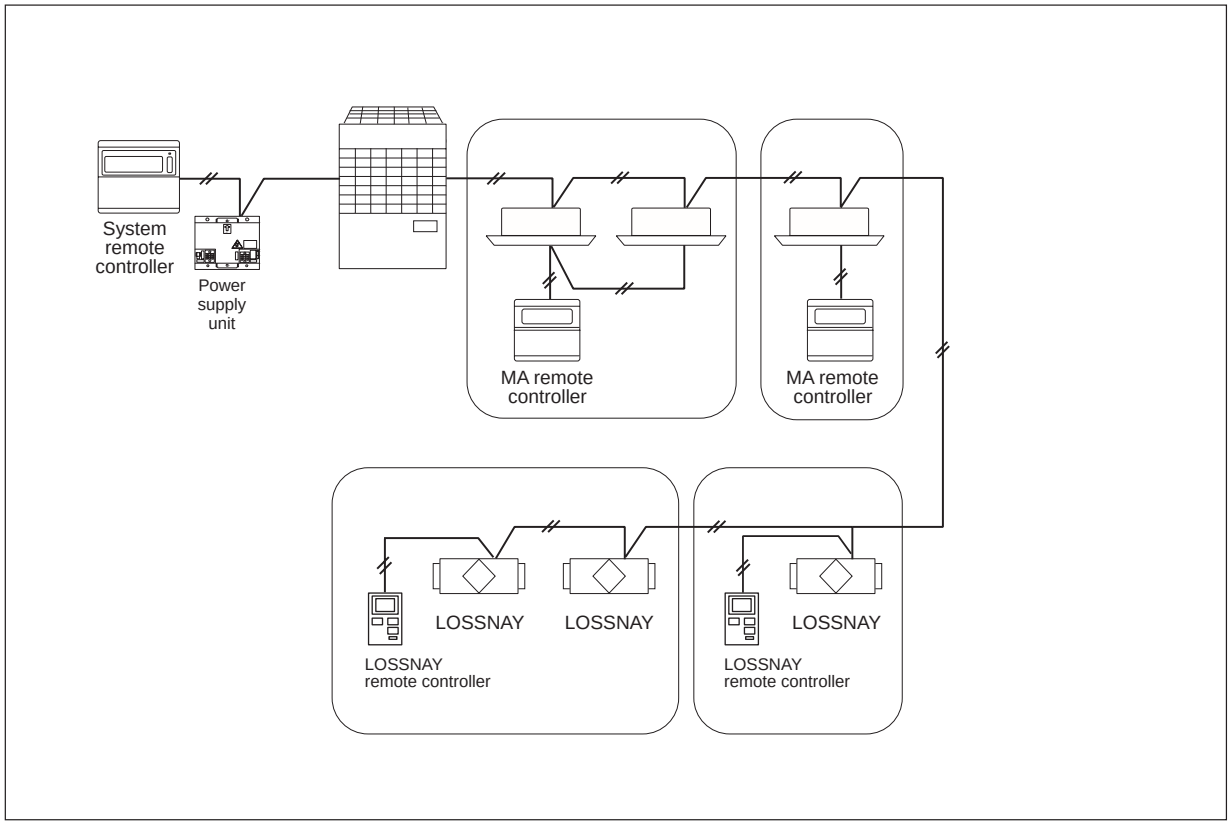
- 50 groups/50 units of air conditioners can be controlled.
  - Up to 50 groups/50 units of air conditioners can be operated with one system group controller.
- Operation status displayed on easy-to-read LCD
  - The group currently operating can be seen at a glance with the operation status display for each group.
- Schedule operation is available
  - Groups of air conditioners are available for operation at a set schedule using the Schedule timer (PAC-YT34STA).
- Independent LOSSNAY operation is possible
  - LOSSNAY units can be grouped the same as the Central remote controller and ON/OFF remote controller.
  - "Automatic ventilation", "Normal ventilation" and "Ventilation with heat exchanger" can be switched from the system controller.

■ Functions

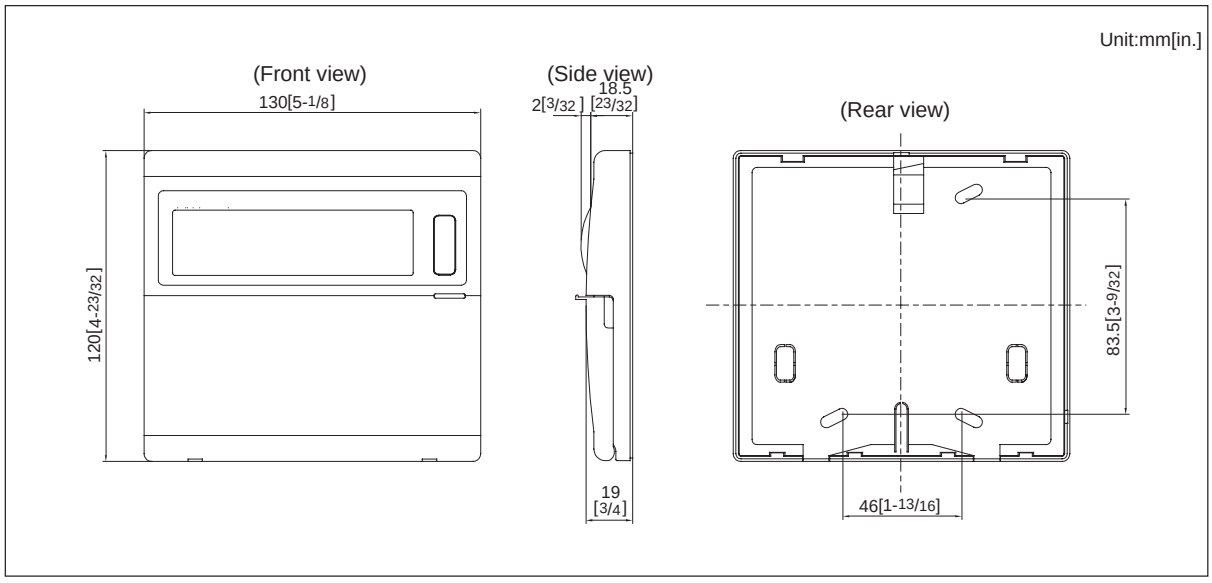
□: Each unit ○: Each group ●: Each block
△: Each floor ◎: Group or collective ×: Not available

Item	Remarks	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	◎	◎
Operation mode switching	Switches between Cool / Dry / Auto※1 / Fan / Heat. ※ There are modes that cannot be selected depending on the unit. ※1 Auto only supported for the CITY MULTI® R2- and WR2-Series.	◎	○
Temperature setting	The temperature can be set within the following range. Values in parentheses are for the medium-temperature indoor unit. Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) For PDFY/PEFY/PFFY by setting Dip SW 7-1 to ON and limits to HIGH fan speed only.	◎	○
Fan speed setting	The fan speed cannot be set.	◎	◎
Air flow direction setting	The air flow direction cannot be set.	◎	◎
Manual operation prohibit/permit (ON/OFF, mode change, setting temperature, filter reset)	The ON/OFF, operation mode, setting temperature and filter sign reset operations using the local remote controllers can be prohibited. ※ [PROHIBIT] will appear when prohibited. Only ON/OFF and filter reset can be prohibited for the LOSSNAY group.	◎	◎
Specific mode operation prohibit (Cooling prohibit, heating prohibit, cooling/heating prohibit)	Operation of the following modes with the local remote controllers can be prohibited. When cooling is prohibited: Cooling, dry, automatic can not be chosen. When heating is prohibited: Heating, automatic can not be chosen. When cooling/heating is prohibited: Cooling, dry, heating, automatic can not be chosen.	◎	◎
Room temperature display	The room temperature cannot be displayed.	–	×
Error display	The details of the currently occurring error are displayed with the address. ※ The address may not be displayed depending on the details of the error.	–	◎
Schedule operation	Ten patterns of weekly schedules can be operated with the Schedule timer.(PAC-YT34STA) ※ The schedule validity can be set for each group.	△	△
Ventilation (independent)	Group operation of only the free plan LOSSNAY is possible. ※ The operation mode of these groups is automatic ventilation, ventilation with heat exchanger and normal ventilation.	○	○
Ventilation (interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. ※ The fan rate and mode cannot be changed. The LED will turn ON during operation after interlocking.	△	△

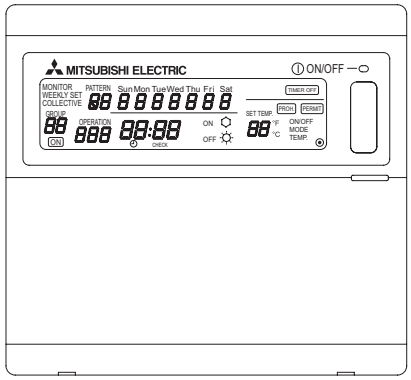
■ System example



■ External dimension



3-2. Schedule timer [PAC-YT34STA]



- The weekly schedule of up to 50 groups/50 units can be controlled with one schedule timer.
- The weekly schedule of up to ten patterns (no setting + nine patterns) is available for setting.
- "ON/OFF", "Operation Prohibit", "COOL /HEAT" and "Set Temperature" can be scheduled with up to 16 settings in one pattern.
- It can be connected to the central control transmission line or to the indoor/outdoor transmission line without the power supply unit. It is non-polar 2-wire.
- It can be interlocked with a building management system using the external input/output managing function.
- An error unit address and error code appear on the display in case of malfunction happening.

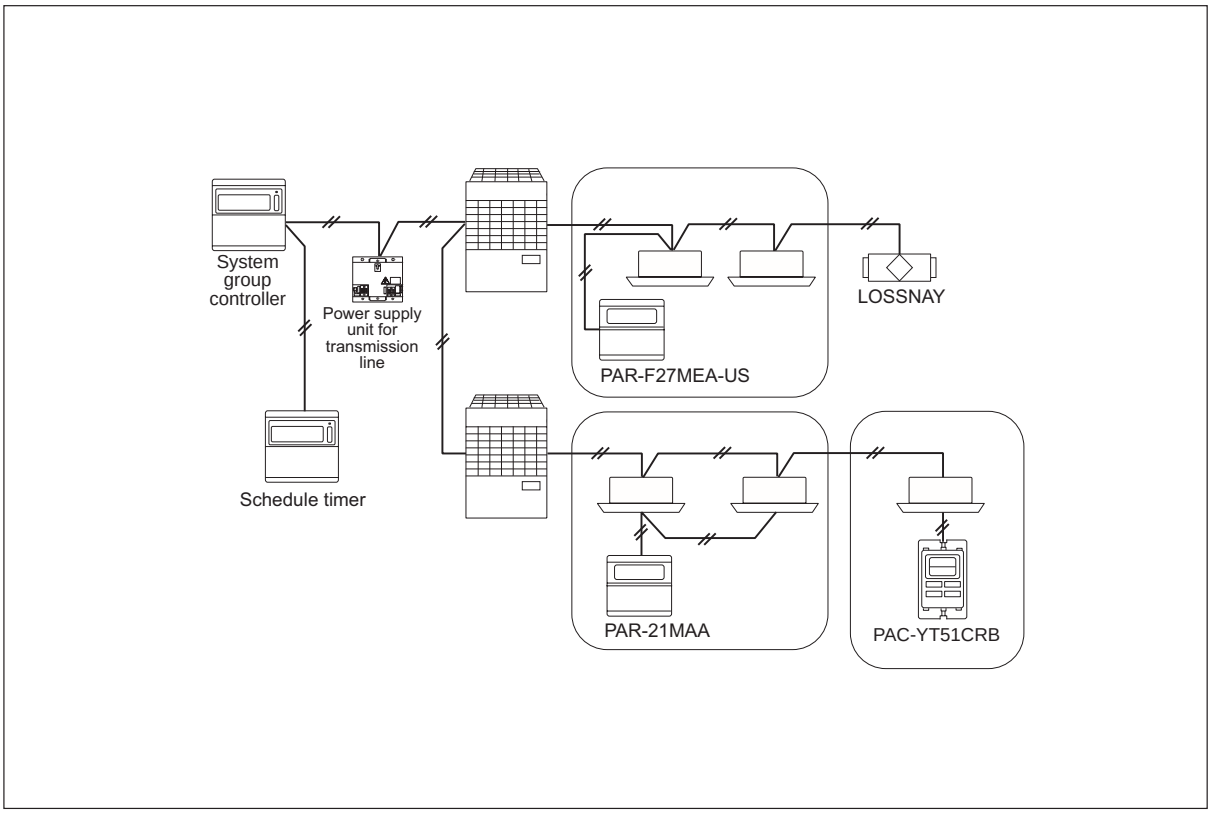
■ Functions

□: Each unit ○: Each group ●: Each block
△: Each floor ◎: Group or collective ×: Not available

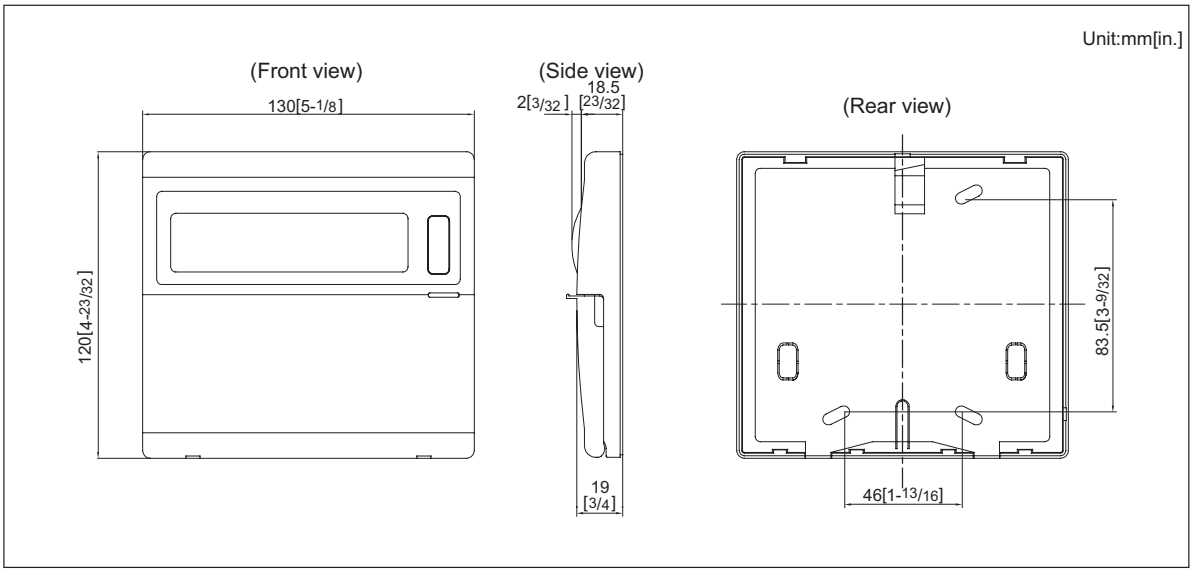
Item		Details	Operations	Display
Unit control		50 units/50 groups (Maximum 16 units connected in one group)	◎	○
Schedule control		One week	○	○
Operation	ON/OFF	ON/OFF operations can be carried out collectively or for each group.	○	○
	Timer reset	The timer setting details can be disabled collectively	○	○
Schedule function	Setting details	ON/OFF COOL/HEAT Room temperature setting (67°F to 83°F / 19°C to 28°C) Operation prohibit (ON/OFF, operation mode, setting temperature)	○	—
	Number of settings	Number of setting patterns: Ten (no setting + nine patterns) (Operation for a week can be set by selecting one of ten patterns for each day.) Number of operations: Up to 16 operations can be set in one pattern	○	—
	Time setting unit	The item can be set in five-minute units	○	—
Display		Current time and day	—	○
		Error state	—	○
		Unit operation state	—	×
External input (Timer connection, emergency stop input, etc.)		The following can be input with the level signals or pulse signals. Level signal: "Emergency stop input" or "Collective ON/OFF" Pulse signal: "Collective ON/OFF" or "Local remote controller prohibit/permit" One input can be selected from those above.	○	—
External output (Error output, operation output)		"ON/OFF" and "error/normal" are output with the level signal. ※ The optional output cable is required.	○	—
Connection position		Indoor/outdoor transmission line: Connectable Central system transmission line: Connectable (Optional power supply unit (PAC-SC50KUA) is needed.)	—	—

CONTROLLER

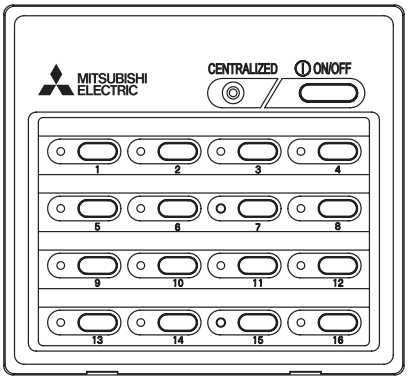
■ System example



■ External dimension



3-3. ON/OFF controller [PAC-YT40ANRA]



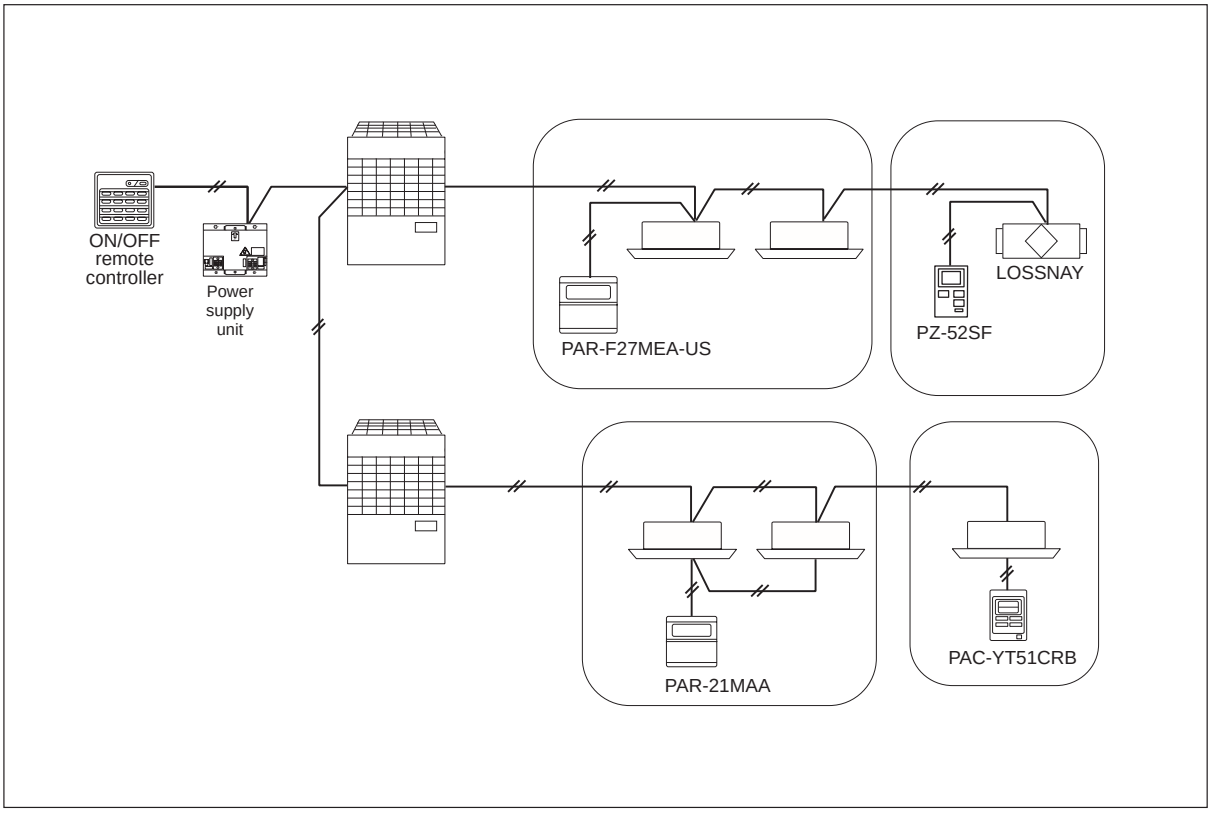
- 16 groups/50 units can be controlled.
  - ・Up to 16 groups/50 units can be operated with one ON/OFF remote controller.
  - ・A general-purpose interface is available for control, so general devices can also be turned ON and OFF.
- Just press a switch to start.
  - ・All of the units can be started and stopped by pressing the main switch, and each unit in the group can be started and stopped with individual switches.
- LED flashing during failure.
  - ・If any error should occur in the air conditioner, its details can be confirmed easily with the flashing LED. The LED also indicates whether each group is running or stopped.
- Interlock operation with external system possible.
  - ▪ It can be flexibly interlocked with a card reader, or building management system, etc., using the incorporated external input/output function.
- Flexible group setting.
  - ▪ The groups can be easily configured, so the group pattern can be freely set according to the layout.
  - ▪ The ON/OFF controller can be connected at the indoor/outdoor transmission line without the power supply unit.

■ Functions

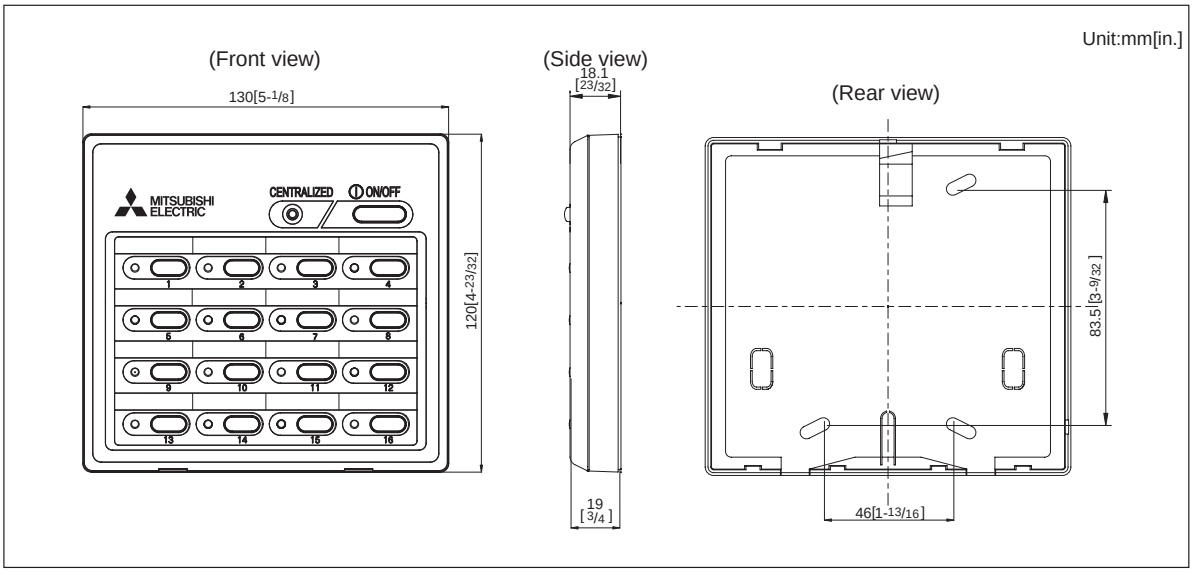
□: Each unit ○: Each group ●: Each block
△: Each floor ◎: Group or collective ×: Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	◎	◎
Operation mode switching	Not available	×	×
Temperature setting	Not available	×	×
Fan speed setting	Not available	×	×
Air flow direction setting	Not available	×	×
Manual operation prohibit/permit (ON/OFF, operation mode, setting temperature, filter reset)	Compatible only with external input.	×	×
Specific mode operation prohibit (Cooling prohibit, heating prohibit, cooling/heating prohibit)	Not available	×	×
Room temperature display	Not available	—	×
Error display	LED flashes during failure. (The error code can be confirmed by removing the cover.)	—	△
Schedule operation	Not available	×	×
Ventilation operation (independent)	Group operation of only LOSSNAY units possible. ※ Only ON/OFF of group.	○	○
Ventilation operation (interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. ※ The fan rate and mode cannot be changed. The LED will turn ON only during operation after interlocking.	△	△
External output (Error output, operation output)	"ON/OFF" and "error/normal" are output with the level signal. ※ The optional output cable is required.	◎	◎
Connection position	Indoor/outdoor transmission line: Connectable Central system transmission line: Connectable (Power supply unit (PAC-SC50KUA) is needed.)	—	—

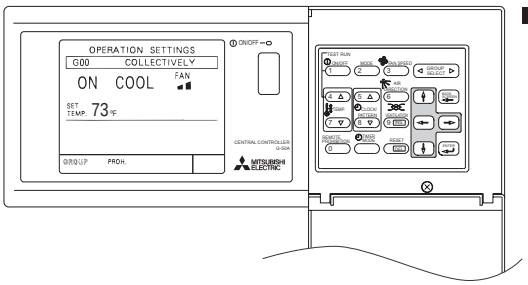
■ System example



■ External dimension



3-4. Central controller [G-50A]



A. The central controller of G-50A combines Web function (optional), which enable the air conditioner system management on a PC browser screen. *1. The management even carried out at a long distance place via public telephone line.

*1 Microsoft® Internet explorer Ver. 5 or later by Microsoft Corporation is needed. Microsoft is a registered trade mark of Microsoft Corporation in the United States and other countries.

B. Together with integrated centralized control software TG-2000A, and/or PLC, many optional functions like "Charging", "Peak-cut", "Energy saving", "General equipment management", "Scheduling" etc, can be carried out. Details, please refer to sections of TG-2000A and PLC software.

C. One G-50A can control maximum 50 Indoor units (including Lossnay). The TG-2000A can manage maximum 40 G-50As, therefore can manage maximum 2000 Indoor units (including Lossnay).

D. Taking advantage of G-50A's Web functions, alarming E-mail containing address and error code can be sent to appointed E-mail address upon any fault happen at the air conditioner system. This could release standby personnel and save operation cost.

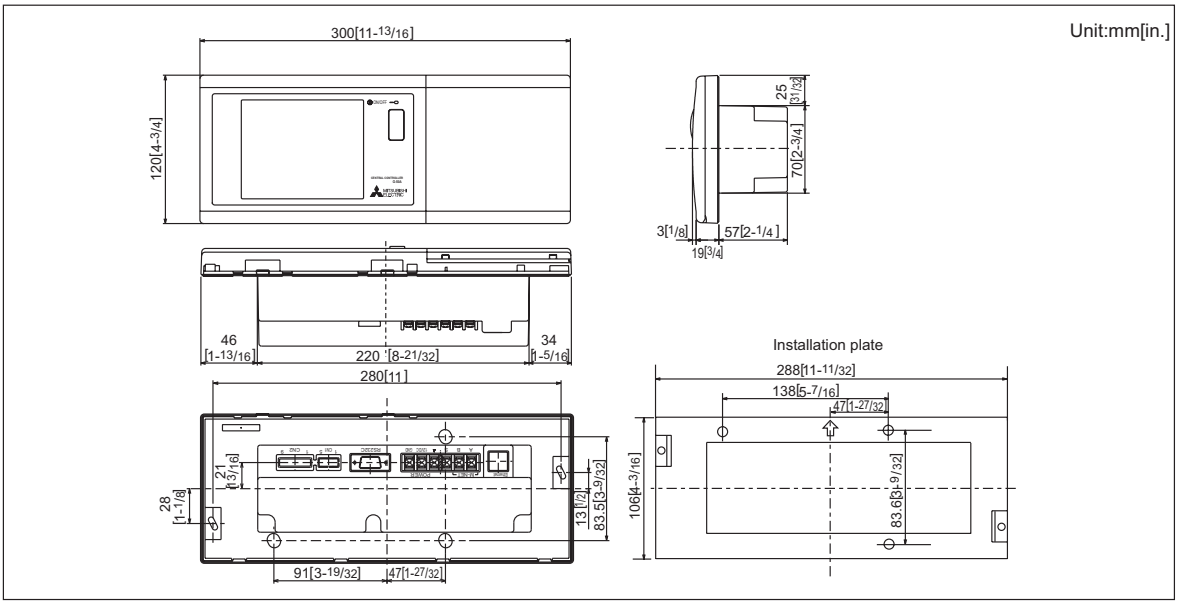
■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	○◎	○◎
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. (Group of LOSSNAY unit : automatic ventilation/ vent - heat interchange/ normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2 and WR2 series.	○◎	○
Temperature setting	Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) in case of PDFY/PEFY/PFFY-E indoor unit. ※ Range of temperature settings vary depending on model.	○◎	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○◎	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, ※1: Louver cannot be set. Air flow direction settings vary depending on the model.	※1 ○◎	○
Timer operation	For one day, you can set start/stop three times and you can set enable/disable three times. For a week's schedule, you can store three start/stop patterns and one enable/disable pattern. ※2: When the timer is set, "Timer enabled" is shown on the operation setting screen of the LCD.	○◎	※2 ○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※3: When the local remote controller inactivation command is received from the master system controller, disabled mark appears in inverted display on the operation screen.	○◎	※3 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed. ※4: When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection.	×	※4 □◎
Test run	This operates air conditioner units in test run mode.	○	○
Ventilation equipment	The interlocked system settings can be performed by the master system controller. When setting the interlocked system, you can use the ventilation switch to switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	○	○
External input/output	By using accessory cables you can set and monitor the following. Input By level signal: "Batch start/stop", "Batch emergency stop" By pulse signal: "Batch start/stop", "Enable/disable local remote controller" Output "Start/stop", "Error/Normal" ※5: Requires the external I/O cable (PAC-YG10HA-E) sold separately.	◎ ※5	◎ ※5

■ External dimension

Unit:mm[in.]



G-50A needs DC power supply of 24~30V and 12V; the former is for central control transmission use and the latter is for G-50A's operating and LAN function use. G-50A can have power-supply at following 1,2,3 methods.

3-4-1-1. Power supply unit PAC-SC50KUA is the recommended power supplier for G-50A. The basic scheme is as follows. For details, please refer to 3-6 Power supply unit PAC-SC50KUA.

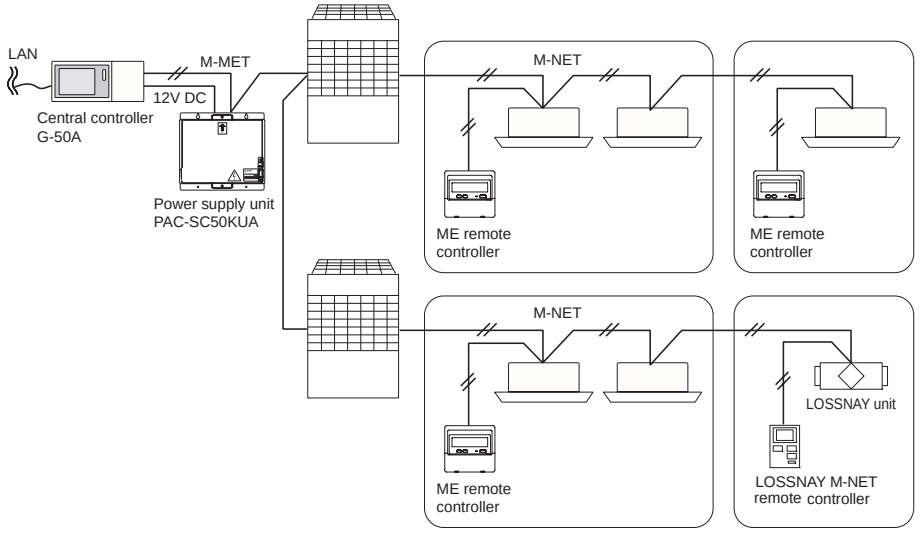


Fig. 3-4-1 G-50A and PAC-SC50KUA basic scheme.

3-4-1-2. Power supply of DC 30V from connector of TB7 or TB3 of Outdoor unit and field supplied DC12V, which specified at Table 3-4-1.

3-4-1-2-1. TB7 and field supplied DC 12V, 0.2A.
As shown at Fig. 3-4-2, G-50A receives power supply of DC 30V from the connector of TB7 at the R410A Outdoor unit together with a field supplied DC12V, 0.2A. In the case, one of the Outdoor units should change its power supply switch of CN41 to CN40.

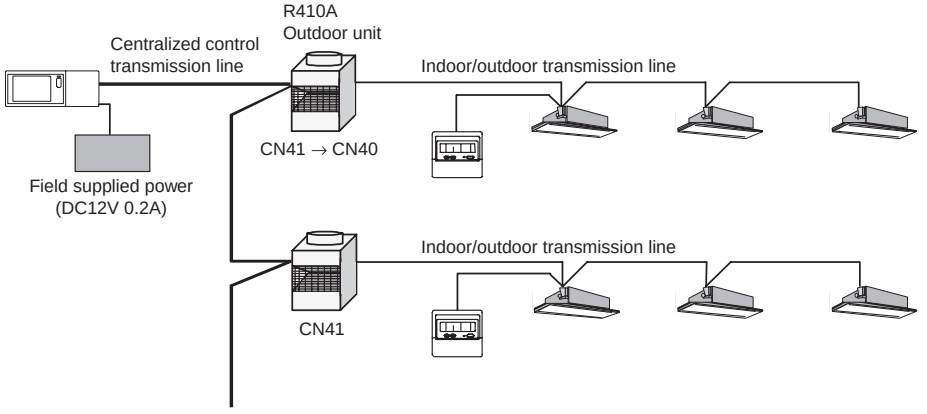


Fig. 3-4-2 G-50A, TB7 and field supplied DC12V scheme.

DC12V Power source should follow the specifications at Table 3-4-1, and the power cable to G-50A should not exceed 10m[32-3/4ft].

Table 3-4-1 DC12V power specifications

Source power	DC12V 0.2A (Maximum loading)
Ripple noise	Lower than 150mVp-p
Compatible specification	Authorized or CE marked products. Subject to regulations: IEC60950 (or EN60950) CISPR22/24 (or EN55022/24) IEC61000-3-2/3-3 (or EN61000-3-2/3/3)

3-4-1-2-2. TB3 and DC 12V, 0.2A

G-50A can also receive power supply from TB3 connector of the R410A or R407C, R22 Outdoor unit. Yet, Outdoor unit down will lead down to G-50A too. The kind of connection is possible but not recommended air conditioner system of multiple Outdoor units. The DC 12V 0.2A can be supplied at TB3 connector of PAC-SC50KUA, or a field supplier power complying specification at Table 3-4-1.

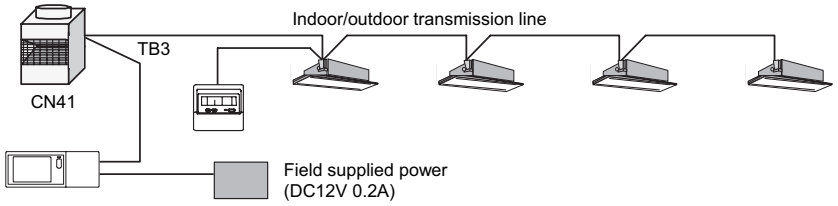


Fig.3-4-3 G-50A, TB3 and field supplied DC 12V scheme.

3-4-1-2-3. The effect on connectable quantity of Indoor unit when TB7 or TB3 is used to supply power to the G-50A.

As Indoor unit controller and system controllers share the power supply from the Outdoor unit, the total power consumption of control use needs following considerations.

Taking the power consumption of the control board of Indoor unit as 1, the equivalent power consumption of the system controller is as follows.

Table 3-4-2 The equivalent power consumption of controllers.

Indoor unit	Central controller (G-50A)	Other system controllers	
		ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-SF44SRA) Schedule timer (PAC-YT34STA)
1	0.5	1	0.5

*In order to ensure the transmission quality in start-up of outdoor unit (or during communication traffic), the number of system controllers which connected to indoor/outdoor transmission line in the same system, should not exceed3.

⚠ CAUTION

- Any trouble caused by the failure of the field supplied DC12V power source is not responsible by Mitsubishi Electric Corporation.
- When applying Charge and/or Peak-cut function on G-50A, Power Supply Unit (PAC-SC50KUA) is recommended to use. G-50A is possible to receive power from the one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause G-50A's function-down on the whole system.
- At the air conditioner system of multiple Outdoor units, the connector of CN41 is changed to CN40 at only one of the Outdoor units when TB7 is used to supply power. When the Outdoor unit failed, the connector at another unit can be changed from CN41 to CN40 to recover the power supply, but remember to change the CN40 back to CN41 at the failed Outdoor unit.

3-4-2. External input/output usage

3-4-2-1. External signal input function

※ External signal input requires the external I/O adapter (Model: PAC-YG10HA-E) sold separately.

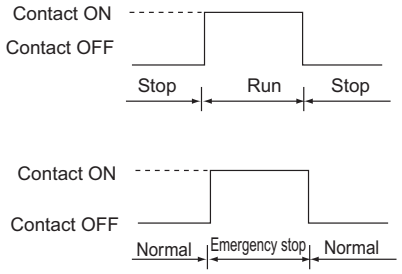
(1) External input

Emergency stop/normal, run/stop and prohibit/enable of local remote controller operation can be controlled for all air conditioners being controlled by using a voltage (DC12V or DC24V) contact signal from an external source.
(Select with the function select setting)

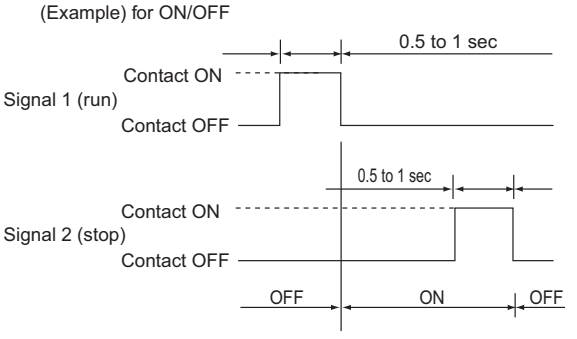
No	External signal input function	Function		Remarks
		No.6	No.7	
1	Do not use external input signal (factory setting)	OFF	OFF	
2	Execute emergency stop/normal with level signal	OFF	ON	The local remote controller ON/OFF operations, and the controller ON/OFF operation and prohibit/enable change operations will be prohibited during emergency stop.
3	Perform ON/OFF with level signal	ON	OFF	The local remote controller ON/OFF operations, and the controller ON/OFF operations and prohibit/enable change operations will be prohibited.
4	Perform ON/OFF, prohibit/enable with pulse signals.	ON	ON	Set the pulse width while the contact is ON to 0.5 to 1 sec.

(2) Level signal and pulse signal (DC12V or DC24V)

(A) Level signal



(B) Pulse signal
(Example) for ON/OFF



※ The prohibit/enable input is the same.

(3)External input specifications

CN2	Lead wire	Emergency stop/normal level signal	ON/OFF, level signal	ON/OFF, prohibit/enable pulse signal
No.5	Orange	Emergency stop/normal input	ON/OFF input	ON input
No.6	Yellow	Not used	Not used	OFF input
No.7	Blue	Not used	Not used	Local remote controller operation prohibit input
No.8	Gray	Not used	Not used	Local remote controller operation enable input
No.9	Red	External DC source "+"		

(A) For level signal

① When the emergency stop/normal signal is selected, the status will change from normal to emergency stop when the external input signal contact changes from OFF to ON, and will change from emergency stop to normal when the contact changes from ON to OFF. Emergency stop signal will bring the air conditioners to stop, and canceling the emergency stop will not automatically reset these units. To go back to the previous operation status, they must be manually turned back on.

② When the ON/OFF signal is selected, the status will change from OFF to ON when the external input signal contact changes from OFF to ON, and will change from ON to OFF when the contact changes from ON to OFF.

(B) For pulse signal

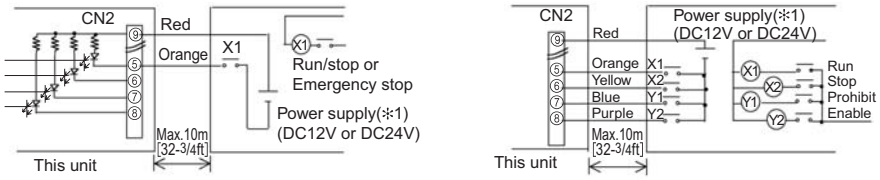
① Even if the ON signal is input during ON, the status will remain ON.

② If the local remote controller is prohibited, the ON/OFF operation mode and temperature setting operations by the local remote controller will be prohibited.

③ Set the pulse width (contact ON time) to 0.5 to 1 sec.

(4)Recommended circuit example

(A) For level signal



① The contact relay, DC power source, extension cable, etc., must be prepared separately at the site.
② The connection cable can be extended up to 10m [32-3/4ft]. (Use a 0.3mm² [AWG22] or larger wire.)
③ Strip the extra cable near the connector, and securely insulate the exposed section with tape, etc.

CONTROLLER

3-4-2-2. External signal output function

※ External signal output requires the external I/o adapter (Model: PAC-YG10HA-E) sold separately.

(1) External output

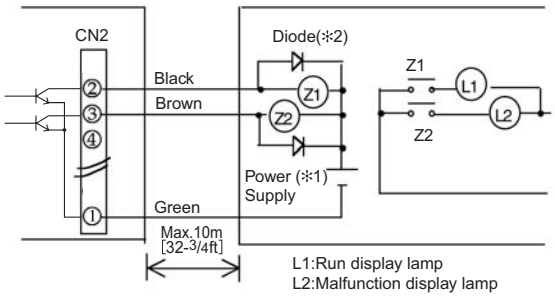
When one or more air conditioners are running, the "ON" signal will be output and if a malfunction occurs in one or more air conditioners, the "Malfunction" signal will be shown.

(2)External output specifications

CN 2	Lead wire	Details of each terminal
No.1	Green	Common (External ground)
No.2	Black	ON/OFF
No.3	Brown	Malfunction/normal

① "ON" signal and " Malfunction" signal will both be output.

(3)Recommended circuit example

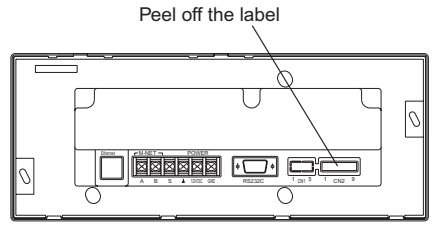


Use Z1 and Z2 relays having the following specifications.
Operation coil
Rated voltage :DC12V,DC24V
Power Consumption : 0.9W or less
(※1)Prepare a power supply separately according to the relay being used. (DC12V or DC24V)
(※2)Always insert a diode on both ends of the relay coil.

① Each element will turn on while ON operation or a malfunction occurs.
② The connection cable can be extended up to 10m [32-3/4ft].
③ The relays, lamps, diodes and extension cables, etc, must be prepared separately at the site.

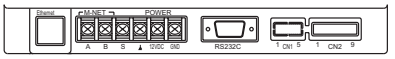
⚠ CAUTION

When connecting the external input/output cables to connector CN2 on the controller, peel off the label on the controller connector section.



3-4-3. LAN connection function

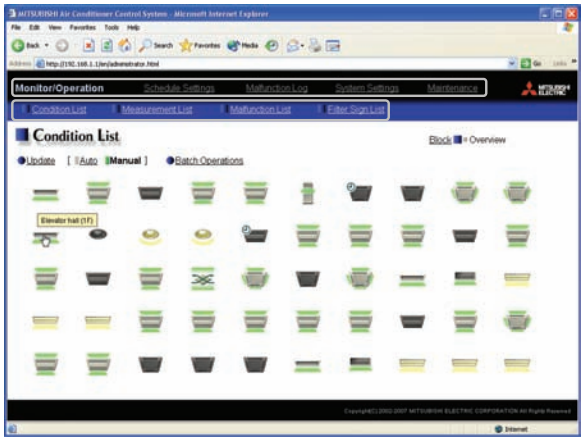
When using the LAN connection function, connect the LAN cable to the Ethernet connector of this device.
* Procure the LAN cable at the site, and use an enhanced category 5 UTP cable.
* For a description of the IP address setting method, refer to Installation Manual.
* LAN is 10 BASE-T Specification.



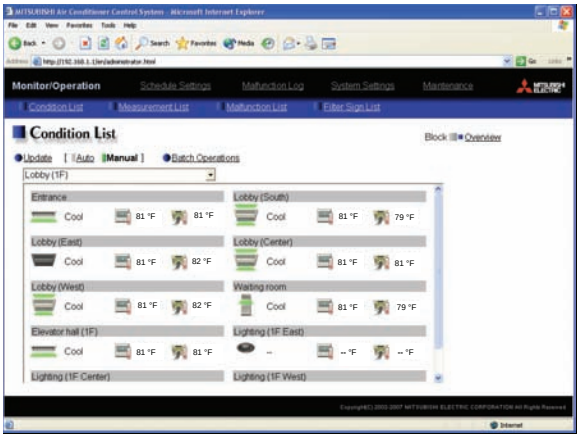
NOTE

* Perform the LAN wiring before installation, and wire up to the body by the same method as wiring the M-NET transmission line.
* When a LAN is already connected, decide the IP address by consultation with the system administrator and connect to the LAN body after changing the IP address.
* When connecting an LAN connector, space for the connector and wiring is required. Provide this space at this unit and the rear of the electric box. Refer to Installation Manual.
* When the G-50A cover is opened, the LAN status lamp and LAN changeover switch are accessed. For detailed information, refer to Instruction Book.

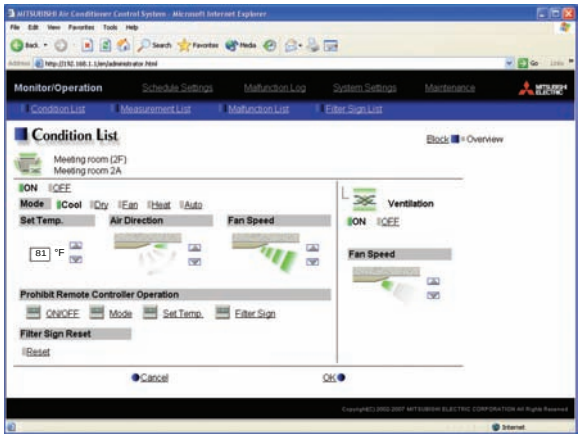
3-4-4. Browser screens of G-50A



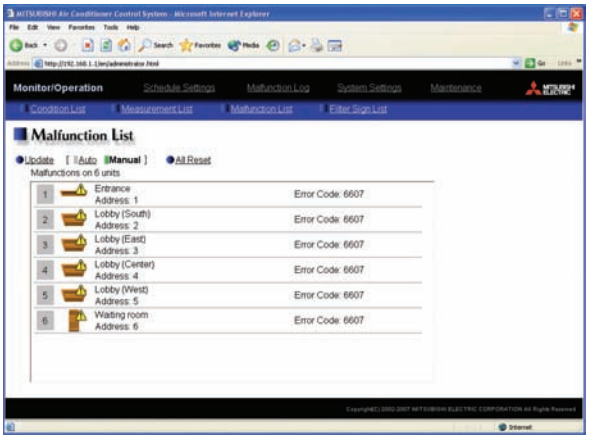
Condition List (Overview)



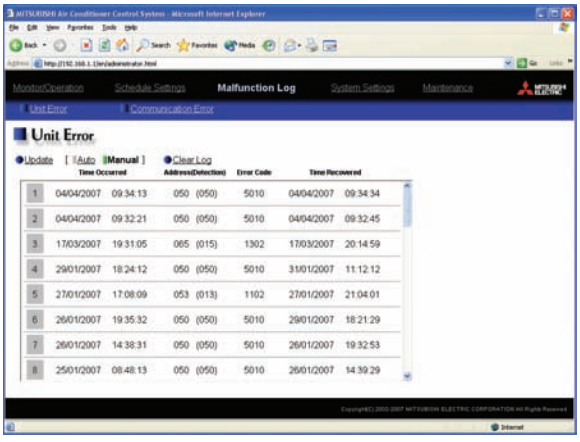
Condition List (Block)



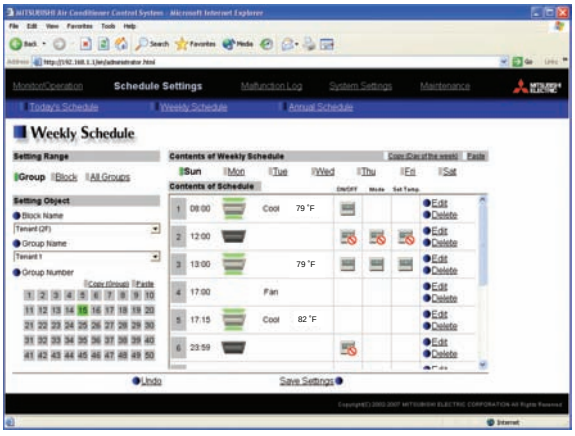
Operation



Malfunction List



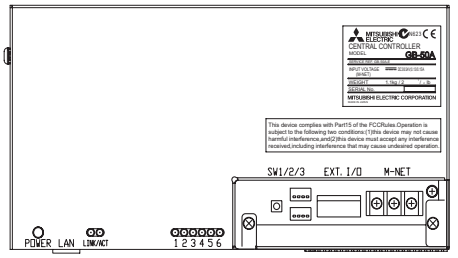
Malfunction Log



Weekly Schedule

CONTROLLER

3-5. Central controller [GB-50A]


CENTRAL CONTROLLER
GB-50A
This device complies with Part15 of the FCC Rules.Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and(2)this device must accept any interference received,including interference that may cause undesired operation.
SW1/2/3
EXT. I/O
M-NET
POWER
LAN
LINK/ACT
1 2 3 4 5 6

A. The central controller of GB-50A combines Web function, which enable the air conditioner system management on a PC browser screen. *1. The management even carried out remotely.

*1 Microsoft® Internet explorer Ver. 5 or later by Microsoft Corporation is needed. Java executing environment is needed.(Microsoft VM Ver.5.0 or later, or SUN Microsystems' Java plug-in Ver.1.4.2 or later) Microsoft is a registered trade mark of Microsoft Corporation in the United States and other countries.

B. Together with integrated centralized control software TG-2000A, and/or PLC, many optional functions like "Charging", "Peak-cut", "Energy saving", "General equipment management", "Scheduling" etc, can be carried out. Details, please refer to sections of TG-2000A and PLC software.

C. One GB-50A can control maximum 50 Indoor units (including Lossnay). The TG-2000A can manage maximum 40 GB-50As, therefore can manage maximum 2,000 Indoor units (including Lossnay).

D. Taking advantage of GB-50A's Web functions, alarming E-mail containing address and error code can be sent to appointed E-mail address upon any fault happen at the air conditioner system. This could release standby personnel and save operation cost.

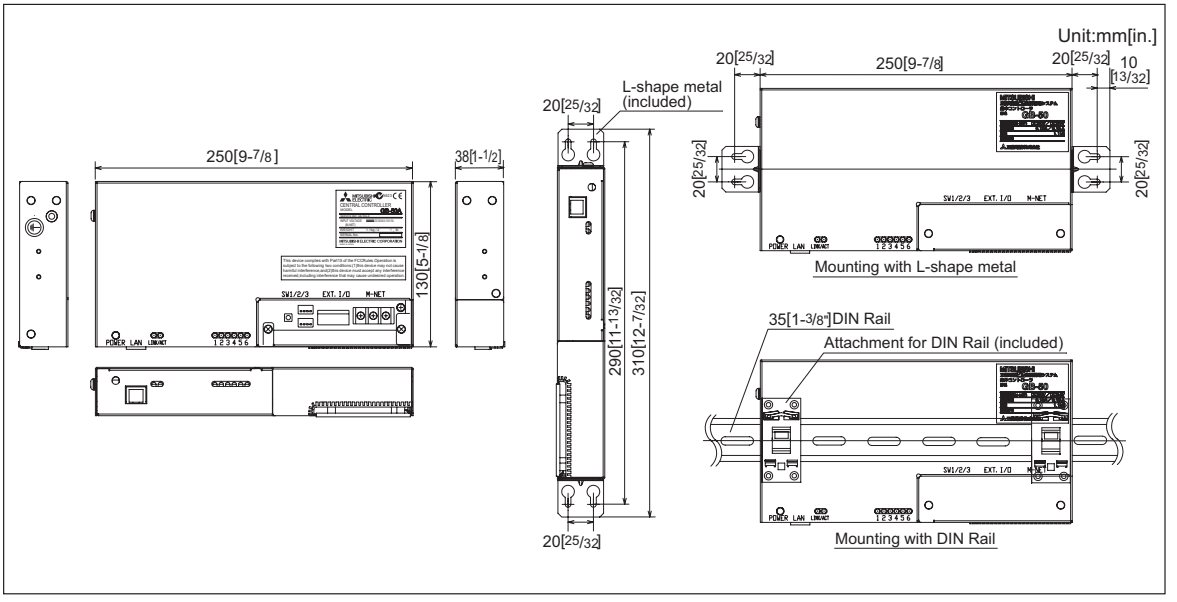
■ Functions

□:Each unit ○:Each group ●:Each block
△:Each floor ◎:Collective ×:Not available

Item	Description	Operations	Display
ON/OFF	Run and stop operation for the air conditioner units	○◎	○◎
Operation mode switching	Switches between Cool / Dry / Auto / Fan / Heat. (Group of LOSSNAY unit : automatic ventilation/ vent - heat interchange/ normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is only for the CITY MULTI® R2 and WR2 series.	○◎	○
Temperature setting	Range of temperature setting Cool/Dry : 67°F - 87°F (57°F - 87°F) / 19°C - 30°C (14°C - 30°C) Heat : 63°F - 83°F (63°F - 83°F) / 17°C - 28°C (17°C - 28°C) Auto : 67°F - 83°F (63°F - 83°F) / 19°C - 28°C (17°C - 28°C) ( ) in case of PDFY/PEFY/PFFY-E indoor unit. ※ Range of temperature settings vary depending on model.	○◎	○
Fan speed setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	○◎	○
Air flow direction setting	Air flow direction angles 100% - 80% - 60% - 40%, Swing, ※1: Louver cannot be set. Air flow direction settings vary depending on the model.	※1 ○◎	○
Permit / Prohibit local operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). ※3: When the local remote controller inactivation command is received from the master system controller, disabled mark appears in inverted display on the operation screen.	○◎	※3 ○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	○
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed. ※4: When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection.	×	※4 □◎
Ventilation equipment	The interlocked system settings can be performed by the master system controller. When setting the interlocked system, you can use the ventilation switch to switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	○	○
External input/output	By using accessory cables you can set and monitor the following. Input By level signal: "Batch start/stop", "Batch emergency stop" By pulse signal: "Batch start/stop", "Enable/disable local remote controller" Output "Start/stop", "Error/Normal" ※5: Requires the external I/O cable (PAC-YG10HA-E) sold separately.	◎ ※5	◎ ※5

*GB-50A needs a PC(field supplied) connected together to monitor and operate the air conditioner system.

■ External dimension



3-5-1. Power supply to GB-50A

GB-50A needs DC power supply of 24~30V for central control transmission use, operating and LAN function use. GB-50A can have power supply at following 1,2,3 methods.

3-5-1-1. Power supply unit PAC-SC50KUA is the recommended power supplier for GB-50A. The basic scheme is as follows. For details, please refer to 3-6 Power supply unit PAC-SC50KUA.

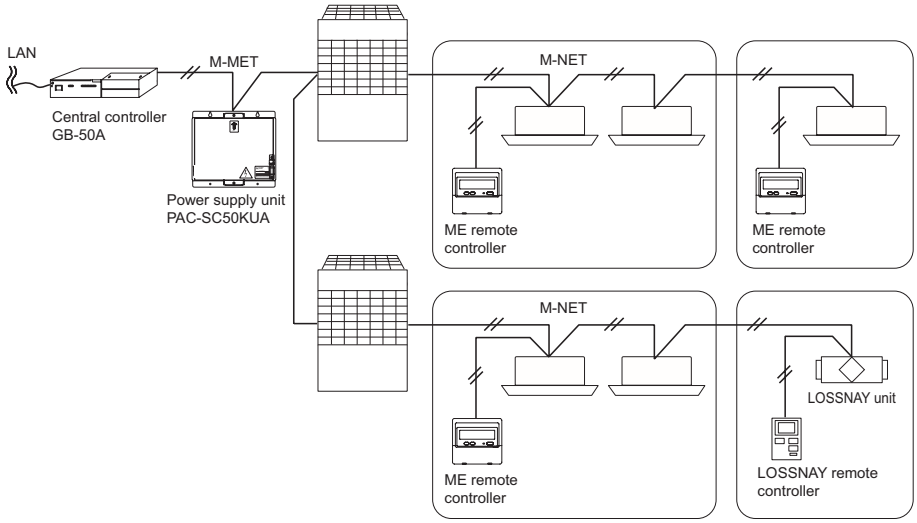


Fig. 3-5-1 GB-50A and PAC-SC50KUA basic scheme.

3-5-1-2. Power supply of DC 30V from connector of TB7 or TB3 of Outdoor unit.

3-5-1-2-1. TB7 of Outdoor unit.
As shown at Fig. 3-5-2, GB-50A receives power supply of DC 30V from the connector of TB7 at the R410A Outdoor unit. In the case, one of the Outdoor units should change its power supply switch of CN41 to CN40.

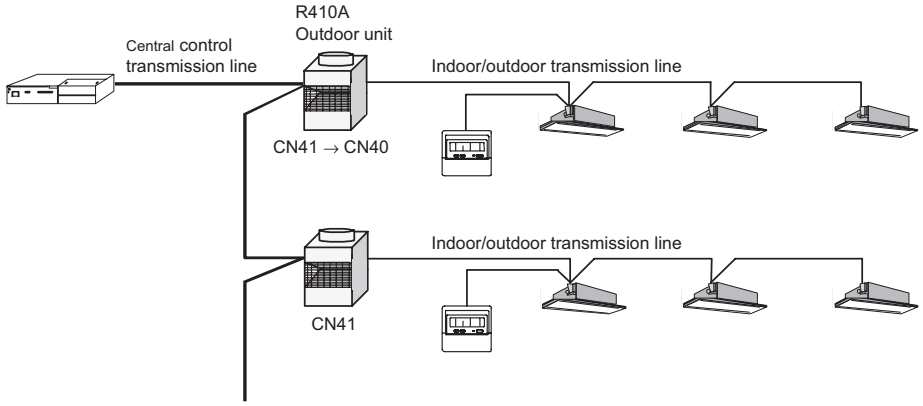


Fig. 3-5-2 GB-50A, TB7 power supply

3-5-1-2-2. TB3 of Outdoor unit.

GB-50A can also receive power supply from TB3 connector of the R410A or R407C, R22 Outdoor unit. Yet, the Outdoor unit down will lead down to GB-50A too. The kind of connection is possible but is not recommended for an air conditioner system of multiple Outdoor units.

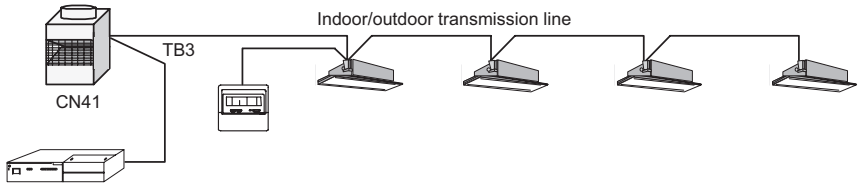


Fig.3-5-3 GB-50A, TB3 power supply

3-5-1-2-3. The effect on connectable quantity of Indoor unit when TB7 or TB3 is used to supply power to the GB-50A.

As Indoor unit controller and system controllers share the power supply from the Outdoor unit, the total power consumption of control use needs following considerations.

Taking the power consumption of the control board of Indoor unit as 1, the equivalent power consumption of the system controller is as follows.

Table 3-5-1 The equivalent power consumption of controllers.

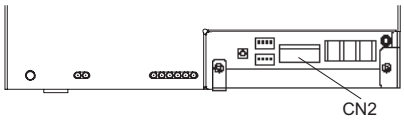
Indoor unit	Central controller (GB-50A)	Other system controllers	
		ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-SF44SRA) Schedule timer (PAC-YT34STA)
1	3	1	0.5

*In order to ensure the transmission quality in start-up of outdoor unit (or during communication traffic), the number of system controllers which connected to indoor/outdoor transmission line in the same system, should not exceed3.

⚠ CAUTION

- When applying Charge and/or Peak-cut function on GB-50A, Power Supply Unit (PAC-SC50KUA) is recommended to use. GB-50A is possible to receive power from the one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause GB-50A's function-down on the whole system.
- At the air conditioner system of multiple Outdoor units, the connector of CN41 is changed to CN40 at only one of the Outdoor units when TB7 is used to supply power. When the Outdoor unit failed, the connector at another unit can be changed from CN41 to CN40 to recover the power supply, but remember to change the CN40 back to CN41 at the failed Outdoor unit.

3-5-2. External input/output usage



3-5-2-1. External signal input function

※ External signal input requires the external I/O adapter (Model: PAC-YG10HA-E) sold separately.

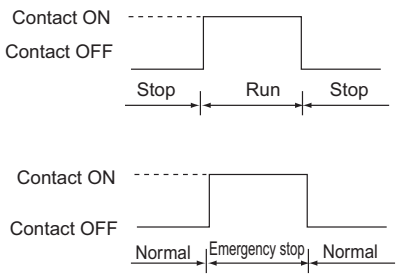
(1) External input

Emergency stop/normal, run/stop and prohibit/enable of local remote controller operation can be controlled for all air conditioners being controlled by using a voltage (DC12V or DC24V) contact signal from an external source.
(Select the function on the Initial Setting Web or the Initial Setting Tool)

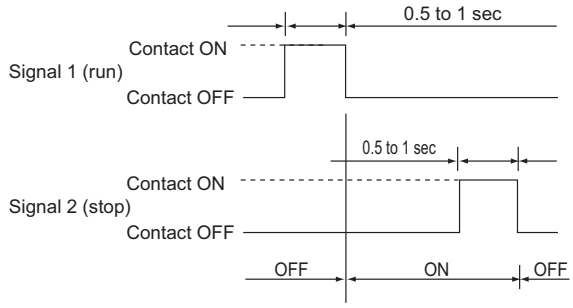
No	External signal input function	Remarks
1	Do not use external input signal (factory setting)	———
2	Execute emergency stop/normal with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operation and prohibit/enable change operations will be prohibited during emergency stop.
3	Perform ON/OFF with level signal	The local remote controller ON/OFF operations, and the controller ON/OFF operations and prohibit/enable change operations will be prohibited.
4	Perform ON/OFF, prohibit/enable with pulse signals.	Set the pulse width while the contact is ON to 0.5 to 1 sec.

(2) Level signal and pulse signal (DC12V or DC24V)

(A) Level signal



(B) Pulse signal
(Example) for ON/OFF



※ The prohibit/enable input is the same.

(3)External input specifications

CN2	Lead wire	Emergency stop/normal level signal	ON/OFF, level signal	ON/OFF, prohibit/enable pulse signal
No.5	Orange	Emergency stop/normal input	ON/OFF input	ON input
No.6	Yellow	Not used	Not used	OFF input
No.7	Blue	Not used	Not used	Local remote controller operation prohibit input
No.8	Gray	Not used	Not used	Local remote controller operation enable input
No.9	Red	External DC source “+”		

(A) For level signal

① When the emergency stop/normal signal is selected, the status will change from normal to emergency stop when the external input signal contact changes from OFF to ON, and will change from emergency stop to normal when the contact changes from ON to OFF. Emergency stop signal will bring the air conditioners to stop, and canceling the emergency stop will not automatically reset these units. To go back to the previous operation status, they must be manually turned back on.

② When the ON/OFF signal is selected, the status will change from OFF to ON when the external input signal contact changes from OFF to ON, and will change from ON to OFF when the contact changes from ON to OFF.

(B) For pulse signal

① Even if the ON signal is input during ON, the status will remain ON.

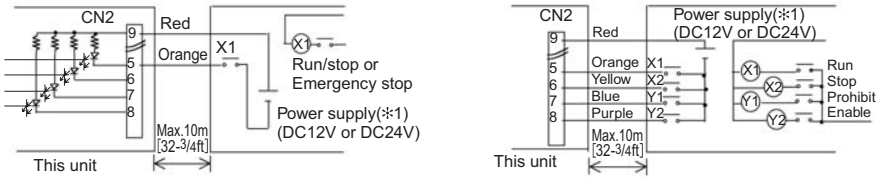
② If the local remote controller is prohibited, the ON/OFF operation mode and temperature setting operations by the local remote controller will be prohibited.

③ Set the pulse width (contact ON time) to 0.5 to 1 sec.

3-5-2-1. External signal input function

(4)Recommended circuit example

(A) For level signal



① The contact relay, DC power source, extension cable, etc., must be prepared separately at the site.
② The connection cable can be extended up to 10m [32-3/4ft]. (Use a 0.3mm^2 [AWG22] or thicker wire.)
③ Strip the extra cable near the connector, and securely insulate the exposed section with tape, etc.

3-5-2-2. External signal output function

※ External signal output requires the external I/o adapter (Model: PAC-YG10HA-E) sold separately.

(1) External output

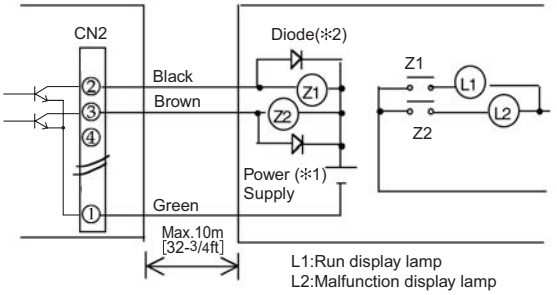
When one or more air conditioners are running, the “ON” signal will be output and if a malfunction occurs in one or more air conditioners, the “Malfunction” signal will be shown.

(2)External output specifications

CN 2	Lead wire	Details of each terminal
No.1	Green	Common (External ground)
No.2	Black	ON/OFF
No.3	Brown	Malfunction/normal

① " ON" signal and " Malfunction" signal will both be output.

(3)Recommended circuit example



Use Z1 and Z2 relays having the following specifications.
Operation coil
Rated voltage :DC12V,DC24V
Power Consumption : 0.9W or less
(※1)Prepare a power supply separately according to the relay being used. (DC12V or DC24V)
(※2)Always insert a diode on both ends of the relay coil.

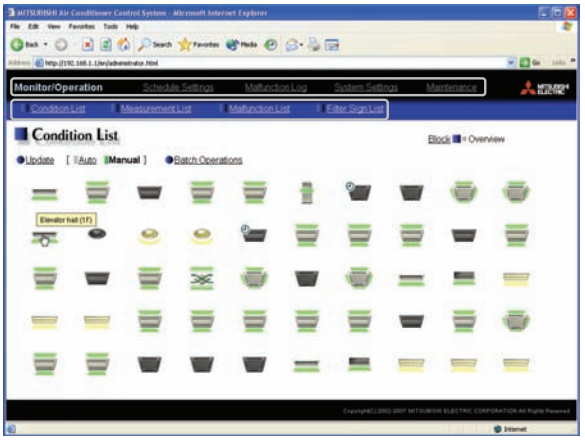
① Each element will turn on while ON operation or a malfunction occurs.
② The connection cable can be extended up to 10m [32-3/4ft].
③ The relays, lamps, diodes and extension cables, etc, must be prepared separately at the site.

3-5-3. LAN connection function

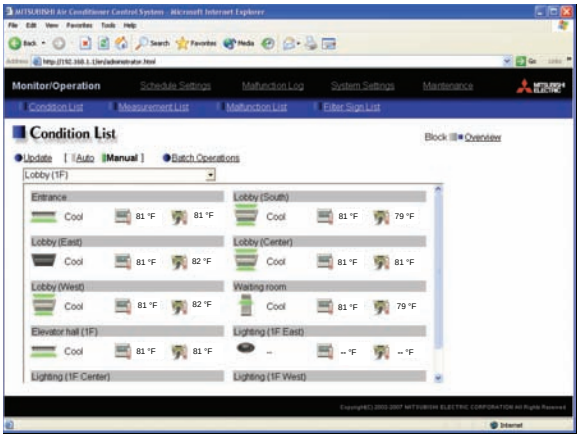
Connect the LAN cable to the LAN connector of this device.
※ Procure the LAN cable at the site, and use an enhanced category 5 UTP cable.
※ For a description of the IP address setting method, refer to Installation Manual.
※ LAN is 10 BASE-T Specification.
※ The maximum wiring length from HUB to GB-50A is 100m [328ft].
※ GB-50A is connected to the monitoring PC via HUB.

NOTE
※ Perform the LAN wiring before installation, and wire up to the body by the same method as wiring the M-NET transmission line.
※ When a LAN is already connected, decide the IP address by consultation with the system administrator and connect to the LAN body after changing the IP address.
※ Space for the connector and wiring is required. Refer to Installation Manual.

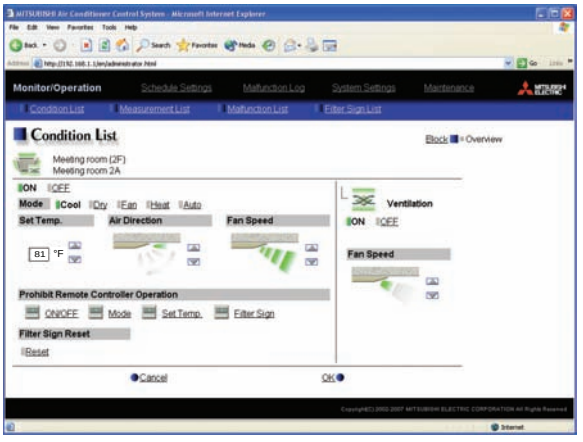
3-5-4. Browser screens of GB-50A



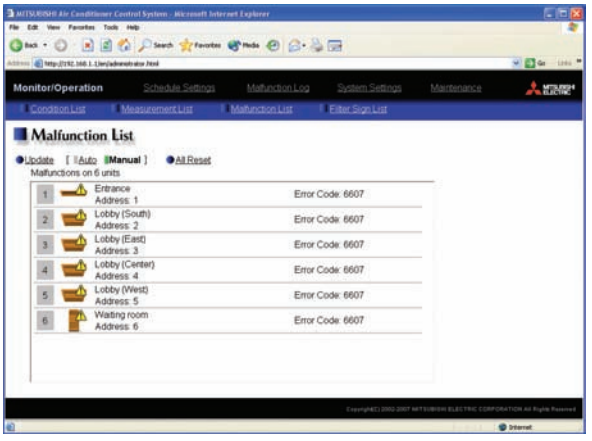
Condition List (Overview)



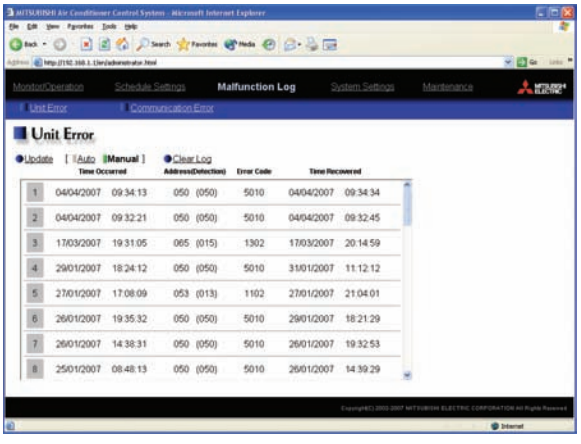
Condition List (Block)



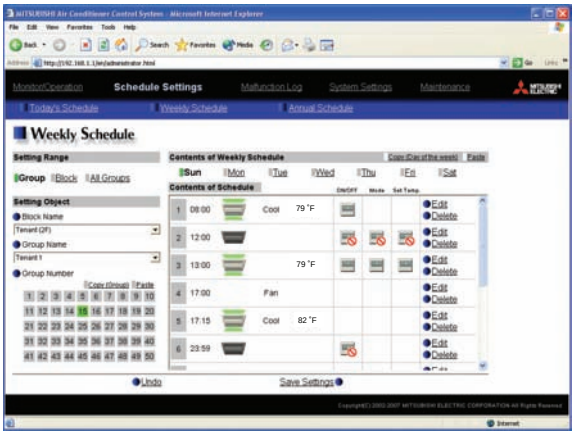
Operation



Malfunction List



Malfunction Log



Weekly Schedule

3-6. Power supply unit [PAC-SC50KUA]

PAC-SC50KUA supplies DC powers of 24V and 12V at TB2 and TB3 respectively; the former is for central control transmission use and the latter is for G-50A operation and LAN function use.

3-6-1. When using PAC-SC50KUA as the power supplier for system controller, the capacity for system controller is considered as follows.

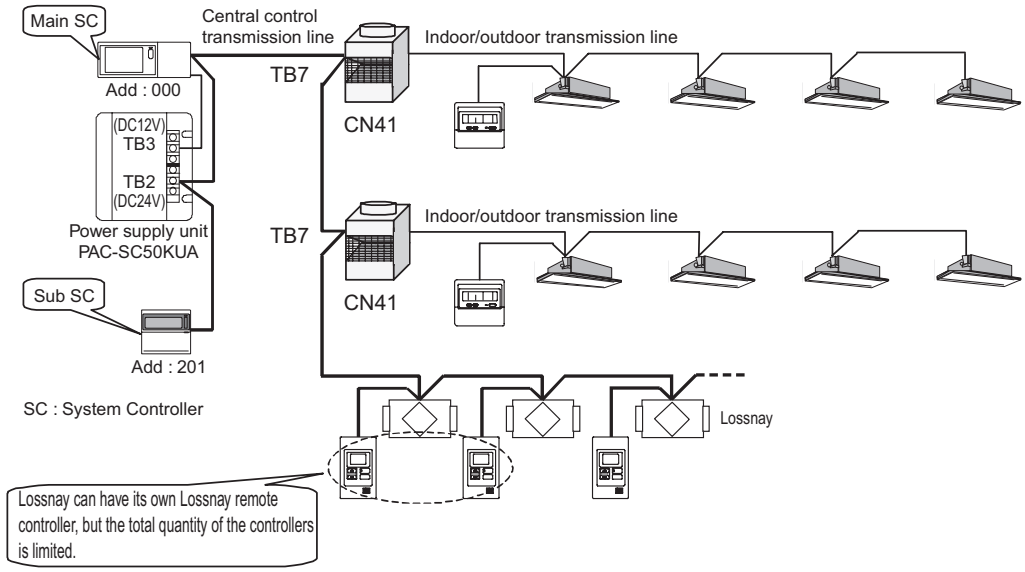


Fig. 3-6-1 Equivalent power consumption of controllers

In this case, pay attention to leave the power supply switch connector on CN41 of the Outdoor unit as the factory setting before shipment.

Taking the power consumption of the control board of Indoor unit as 1, the power consumption of various controllers is rated at Table 3-6-1.

Table 3-6-1 Equivalent power consumption of controllers

Central controller		Other system controllers		Remote controllers
G-50A	GB-50A	ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-SF44SRA) Schedule timer (PAC-YT34STA)	ME remote controller (PAR-F27MEA) LOSSNAY remote controller (PZ-52SF)
0.5	3	1	0.5	0.25

PAC-SC50KUA is capable to supply equivalent power up to 6, therefore the maximum connectable number of system controllers is as follows.

Table 3-6-2 Max. connectable quantity of controller when using PAC-SC50KUA

Central controller		Other system controllers		Remote controllers
G-50A	GB-50A	ON/OFF remote controller (PAC-YT40ANRA)	System remote controller (PAC-SF44SRA) Schedule timer (PAC-YT34STA)	ME remote controller (PAR-F27MEA) LOSSNAY remote controller (PZ-52SF)
2 units (Note 1)	2 units	6 units	12 units	24 units

(Note 1) Due to its current limit of DC12V supplying, the PAC-SC50KUA can supply power for maximum 2 G-50As.

As the air conditioner control system may combine all kinds of system controllers, the total power consumption of system controllers need to count with Table 3-6-1.
For example, the controller system contain 1 G-50A, 2 ON/OFF remote controllers (PAC-YT40ANRA), 1 schedule timer (PAC-YT34STA), 6 Lossnay remote controllers connected at centralized control communication line.
then the total power consumption is
1x0.5+2x1+1x0.5 +6x0.25 = 4.5 < 6.
One PAC-SC50KUA is therefore enough. The total power consumption should not exceed 6.

3-6-2. When supply power to 1 G-50A, the PAC-SC50KUA can supply power to other system controllers as follows.

Table 13-2-3 Connectable number of system controller when 1 G-50A is used.

V : Connectable

		Total number of ON/OFF remote controller (AN)						
		0	1	2	3	4	5	6
Total number of System remote controller Schedule timer	0	-	V	V	V	V	V	
	1	V	V	V	V	V	V	
	2	V	V	V	V	V		
	3	V	V	V	V	V		
	4	V	V	V	V			
	5	V	V	V	V			
	6	V	V	V				
	7	V	V	V				
	8	V	V					
	9	V	V					
	10	V						
	11	V						
	12							

⚠ CAUTION

- When applying Charge and/or Peak-cut function on G-50A, Power Supply Unit (PAC-SC50KUA) is recommended to use. G-50A is possible to receive power from one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause G-50A's function-down on the whole system.

3-6-3. When supply power to 1 GB-50A, the PAC-SC50KUA can supply power to other system controllers as follows.

Table 13-2-4 Connectable number of system controller when 1 GB-50A is used.

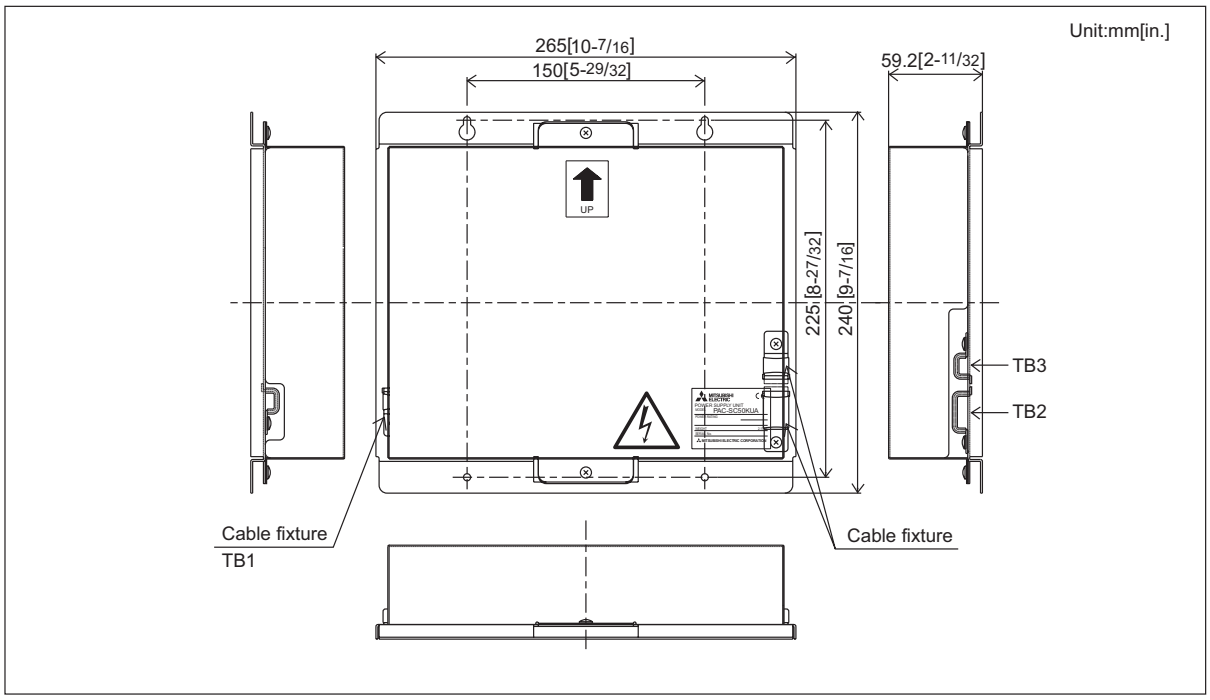
V : Connectable

		Total number of ON/OFF remote controller (AN)						
		0	1	2	3	4	5	6
Total number of System remote controller Schedule timer	0	-	V	V	V			
	1	V	V	V				
	2	V	V	V				
	3	V	V					
	4	V	V					
	5	V						
	6	V						
	7							
	8							
	9							
	10							
	11							
	12							

⚠ CAUTION

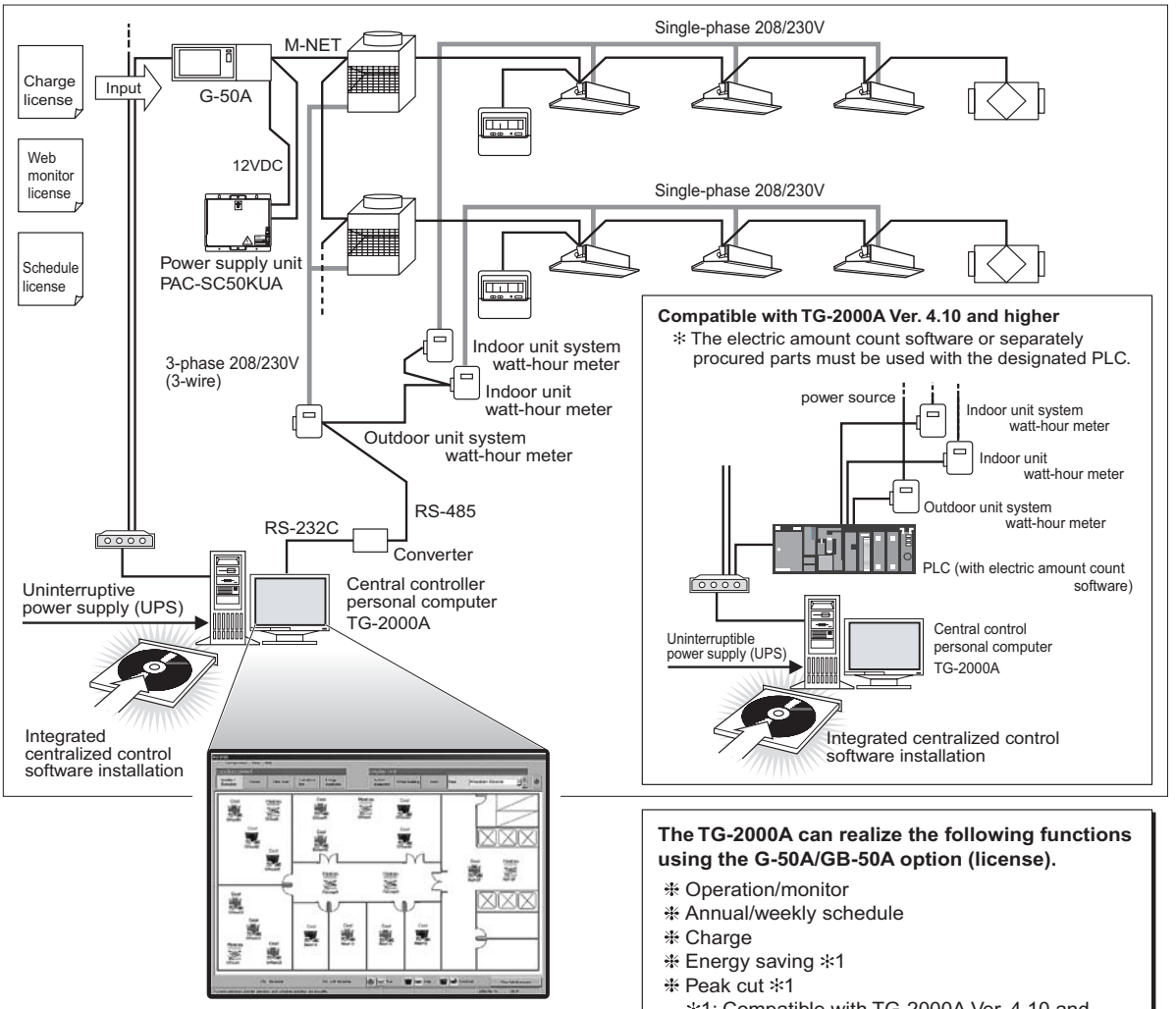
- When applying Charge and/or Peak-cut function on GB-50A, Power Supply Unit (PAC-SC50KUA) is recommended to use. GB-50A is possible to receive power from one of the Outdoor units, but there is a risk that the failure of power supply from the Outdoor unit will cause GB-50A's function-down on the whole system.

■ External dimension



3-7. Integrated centralized control software [TG-2000A]

3-7-1. Example of Basic System Configuration.



The TG-2000A can realize the following functions using the G-50A/GB-50A option (license).

- ❊ Operation/monitor
- ❊ Annual/weekly schedule
- ❊ Charge
- ❊ Energy saving ※1
- ❊ Peak cut ※1

※1: Compatible with TG-2000A Ver. 4.10 and higher, G-50A Ver. 2.51 or later.

■ Main features of TG-2000A

① Up to 2000 indoor units (40 G-50A or GB-50A units) can be operated and monitored simultaneously.
② The air-conditioner layout can be displayed on the screen, making control and operation easier.
③ The annual and weekly schedules can be set. Two schedules, such as the summer master and winter master, can be saved in the weekly schedule.
④ Air-conditioning charges can be calculated based on the multiple air-conditioner usage results. The power apportionment percentage data and apportioned power rate can be calculated for each indoor unit using the power apportionment function, and can be output as a CSV format file. ※ Power apportionment charging is not possible with the old model, A control or K control.

Charging without WHM : The user manually inputs the power rate to calculate the air-conditioning charges. (Using a tool)
RS-485 WHM charging : The RS-485 WHM value is automatically tabulated to calculate the air-conditioning charges.
PLC + pulse WHM charging : The pulse output WHM value is automatically tabulated by the PLC to calculate the air-conditioning charges.

⑤ Energy saving operation is possible using the "ON/OFF", "set temperature change", "fan operation changeover" and "performance save operation (60% to 90%)" functions.
Energy saving operation matching the amount of power in use is possible by using the PLC's electric amount count software.
⑥ Night Set-Back function operation is possible with schedule settings. ※1,4
⑦ General equipment can be operated and monitored. ※2
⑧ General equipment can be schedule-controlled when using PAC-YG21CDA with PLC.
For details of PLC refer to Installation Manual of PAC-YG21CDA. ※3

※1: Compatible with TG-2000A Ver. 4.10 or later, G-50A Ver. 2.51 or later.
※2: Compatible with TG-2000A Ver. 4.30 or later, G-50A Ver. 2.51 or later.
※3: Compatible with TG-2000A Ver. 4.60 or later, G-50A Ver. 2.70 or later.
※4: With Night Set-Back function, the CITY MULTI system can run at heating mode with target temperature set to 54°F /12°C under schedule control. This function can protect the room from dropping down to extremely low temperature at mid-night.

3-7-2. List of TG-2000A functions

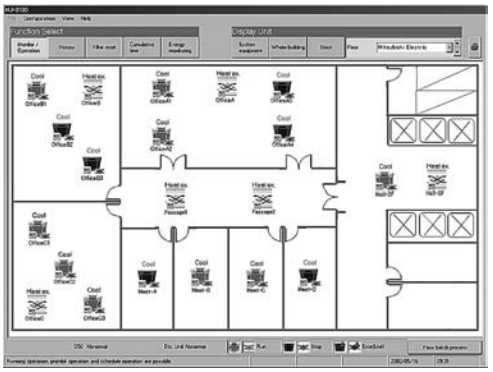
The data for each G-50A/GB-50A can be grouped and used to control the operation of up to 2000 units in floor or block units, etc., from the personal computer screen. By using a PLC or a watt-hour meter, the power rate can be apportioned, energy saving control can be executed, and other general equipment can be controlled.

List of integral software functions

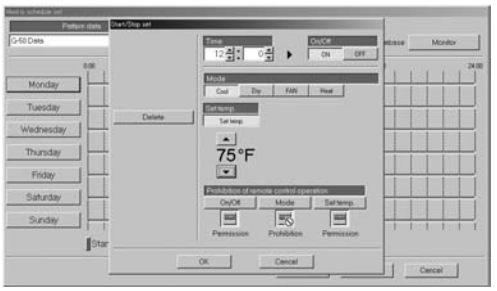
Item	Details	G-50A/GB-50A license					
		Web monitor	Charge	Schedule	Energy saving	Energy saving (peak cut)	PLC for general equipment
ON/OFF	The units can be turned ON and OFF for all floors or in block, floor or group units.	V					
	The general equipment can be turned ON and OFF. (※ A PLC and the general equipment control PLC software required.) ※2	V					
Operation modes	The operation mode can be switched between COOL, DRY, FAN, AUTO and HEAT for all floors or in block, floor or group units.	V					
Temperature setting	The room temperature can be set for all floors or in block, floor or group units. Set temperature range COOL / DRY : 66°F to 86°F / 19°C to 30°C HEAT : 63°F to 82°F / 17°C to 28°C AUTO : 66°F to 82°F / 19°C to 28°C ※ Depend on unit type	V					
Fan speed	The fan speed can be set to four stages for all floors or in block, floor or group units.	V					
Air direction	The air direction can be set in four vertical directions or to swing for all floors or in block, floor or group units.(The selectab le air direction differs according to the model.)	V					
Interlocked unit ON/OFF (LOSSNAY)	If there is an interlocked unit (LOSSNAY), the unit can be turned ON (strong/weak) or OFF for all floors or in block, floor or group units. (Note that the ventilation mode cannot be selected for interlocked units.)	V					
Local operation prohibit	The items for which operation with the local remote controller are to be prohibited can be selected for all floors or in block, floor or group units. (The items that can be prohibited are ON/OFF, operation mode, set temperature and filter sign reset.)	V					
Annual / weekly schedule	The annual/weekly schedule function can be used by registering the license. Two settings, such as seasonal settings for summer and winter, can be saved.	V		V			
Power rate apportionment charging (power rate manual input)	By registering the G-50A unit license number, the power rate apportionment percentage data for each indoor unit can be output in CSV format. The power rate for each tenant can be easily calculated by having each user input the power rate manually.	V	V				
Power rate apportionment charging	An RS-485 watt-hour meter is connected to calculate the air-conditioning charges based on the amount each tenant's air-conditioner has operated. Two charging rates can be applied per day.	V	V				
	By using a PLC (with electric amount count software) and a watt-hour meter with pulse transmitter, the air-conditioning charges can be calculated based on the amount each tenant's air-conditioner has operated.Up to five charging rates can be applied per day. ※1						
History	Up to 3000 items for the error history and up to 10000 items for operation history can be saved. Each history file can be output as a daily report or monthly report in CSV format. The operation history consists only of the operations carried out with the TG-2000A, and is limited to some limited operation items.	V					
Operation time monitor	The cumulative operation time of each indoor unit can be viewed or output as a CSV format file. (This function is valid only when the charging function license is registered.)	V	V				
Filter sign display mask	Automatic display of the filter sign can be disabled. (System batch.) In this case, the filter sign state is confirmed with manual operations .	V					
Energy saving control ※1	Energy saving operation is possible using the "ON/OFF", "set temperature change", "fan operation changeover" and "performance save operation" functions.	V			V		
Energy saving (peak cut) ※1	Energy saving operation matching the amount of power in use is possible. (PLC (with electric amount count software) and watt-hour meter with pulse transmitter are required.)	V				V	
Night Set-Back function ※1,4	Heating from 54°F / 12°C and higher can be set using the schedule.	V		V			
Set temperature limit ※1	The set temperature lower limit can be set for cooling and the upper limit for heating. (Valid only when PAR-F27MEA is used.)	V					
Control other general equipment	It is possible to control other general equipment on ON/OFF operation / monitoring / Alarm / scheduling, if TG-2000A combines PLC installed with PLC software PAC-YG21CDA. ※2	V					
	Setting inter-lock with CITYMULTI indoor units is possible. (Table setting tool for input/output definition is needed.) ※3	V					V

※1: Compatible with TG-2000A Ver. 4.10 or later, G-50A Ver. 2.51 or later.
※2: Compatible with TG-2000A Ver. 4.30 or later, G-50A Ver. 2.51 or later.
※3: Compatible with TG-2000A Ver. 4.60 or later, G-50A Ver. 2.70 or later.
※4: With Night Set-Back function, the CITY MULTI system can run at heating mode with target temperature set to 54°F / 12°C under schedule control.
This function can protect the room from dropping down to extremely low temperature at mid-night.

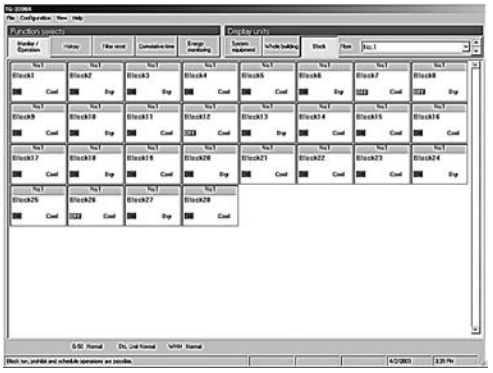
3-7-3. Browser screens of TG-2000A



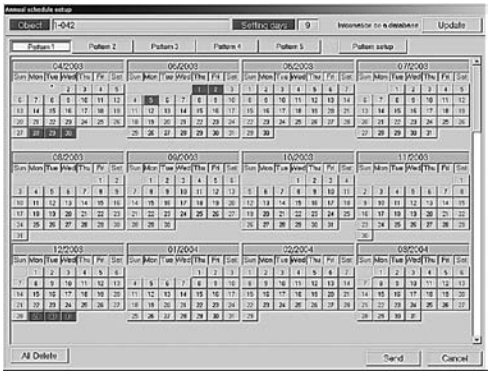
Floor screen



Weekly schedule screen

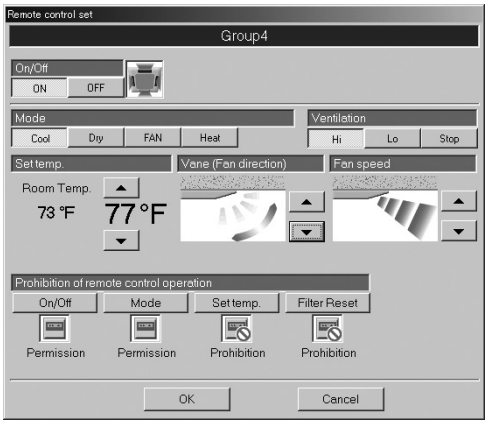


Block screen

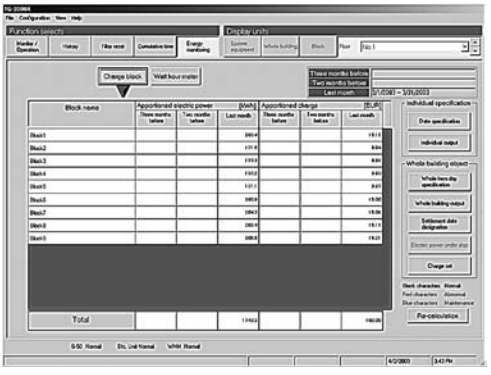


Annual schedule screen

All floor screen



Operation setting screen



Air-conditioning charge screen

3-7-4. Requirements (system recommendations)

We recommend the following software and hardware when using this application (TG-2000A).

Item	Requirement	Recommended
PC	PC/AT interchangeable machine	Operation check completed, using IBM, and DELL
CPU	Within 1000 indoor units : Pentium 4 1.8GHz or faster 1001 indoor units or over : Pentium 4 1.8GHz or faster (Case of temp, trend use : 2.8GHz or faster.)	Pentium 4 2.8GHz or faster
Memory	128MB or more (In Windows XP : 256MB or more)	512MB or more
HDD	6GB or more (2GB or more of C drive free space necessary)	4GB or more of C drive free space necessary When using the trend function, the drive used for automatic output must have the following free space according to the number of groups. 200 groups = 2GB, 500 groups = 5GB, 1000 groups = 10GB, 2000 groups = 20GB
Storage device	FDD, CD-ROM drive	Devices other than those shown at the left may also be installed.
Resolution	1024 × 768 or higher, 65536 colors or more	
Serial port	1 port or more	Required when using RS-485 communication WHM
LAN	Internal LAN (10/100 Mbps)	✻1
OS	Windows XP Professional Windows 2000 Professional Service Pack 2 and above	English version only ✻ Personal computer must support each OS.
Other	Computer must be dedicated for this use (TG-2000A).	

✻1 Purchase the option, or use the equipment recommended for the personal computer when purchasing the personal computer.

3-7-5. Compatible Units

The TG-2000A has two main functions: centralized control of air conditioners and cost accounting. However, not all functions are available with all air conditioners. (TG-2000A Ver.4.80 or later)

Table: Compatible units and function list (○: supported, △: Certain restrictions apply, ×: Not supported)

Function / Model	Control/ Maintenance	Charging (Billing) without WHM	Charging (Billing) with WHM
Y-Series	○	○ ✻1	
R2-Series	○	○ ✻1	
WR2-Series	○	○ ✻1	
WY-Series	○	○ ✻1	
S-Series	○	○ ✻1	
Indoor unit	○	○ ✻2	
LOSSNAY	○	○ ✻4	
OA processing unit	○	○ ✻1	
"A" control type ✻3	○ (Adapter required)	○ ✻1	
"K" control type ✻3	○ (Converter required)	○ ✻1	

✻1 : Can be calculated for each charging block. May not be available with some older models.

✻2 : Indoor unit models before Free Plan models do not support a charge apportioning billing method based on the “capacity save”. The existence of even a single unit of those types in the system requires that the method of charge apportioning billing be set to either “Thermo on time” or “Fan operation time”.

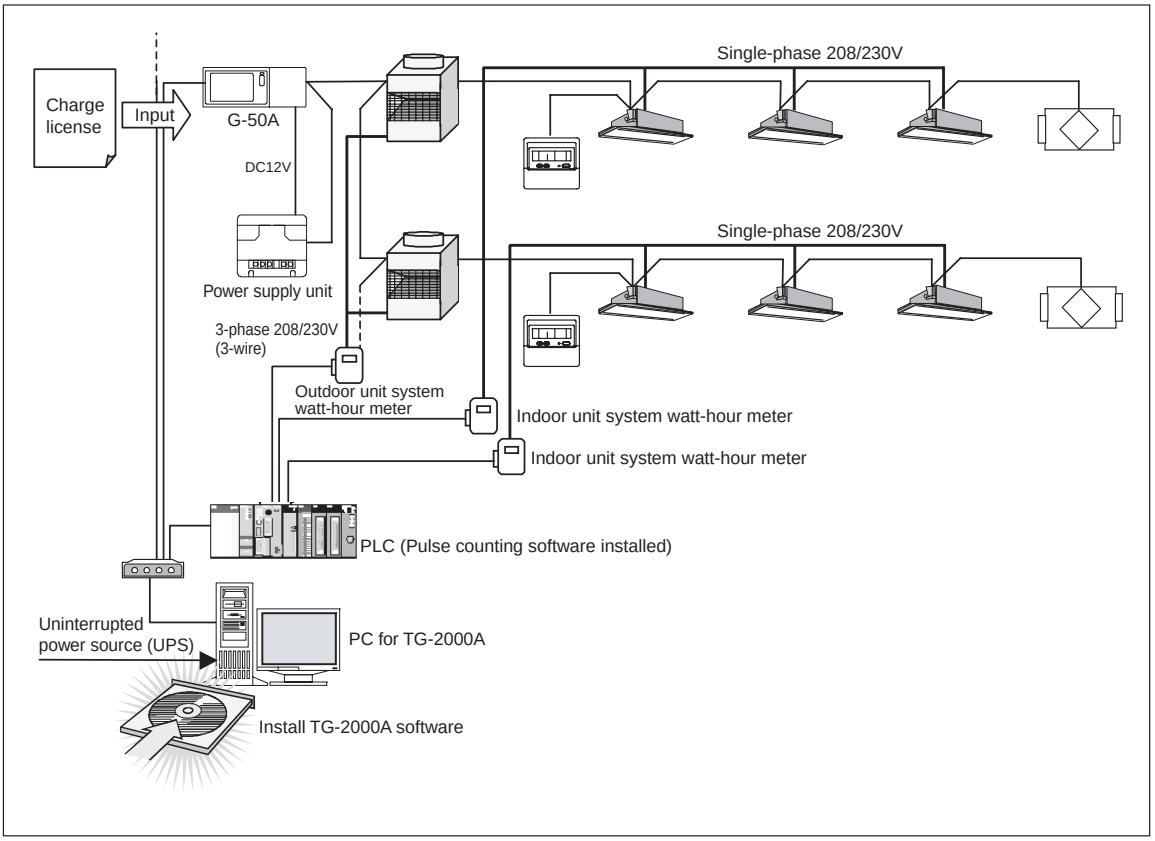
✻3 : Not all of the A-control and K-control units support these functions. The calculation of the charge for the auxiliary heater may not be handled by these units.

✻4 : LOSSNAY groups to which the remote controller is connected support the charging system.

3-8. Electric amount count software [PAC-YG11CDA]

MITSUBISHI ELECTRIC offers charging function for the air conditioner system. Detailed output of every indoor on electricity consumption of air-conditioning is available. The electricity consumption of air-conditioner is counted based on the refrigerant consumption of every indoor unit, which makes the proportion of electricity consumption precise.

■ System example



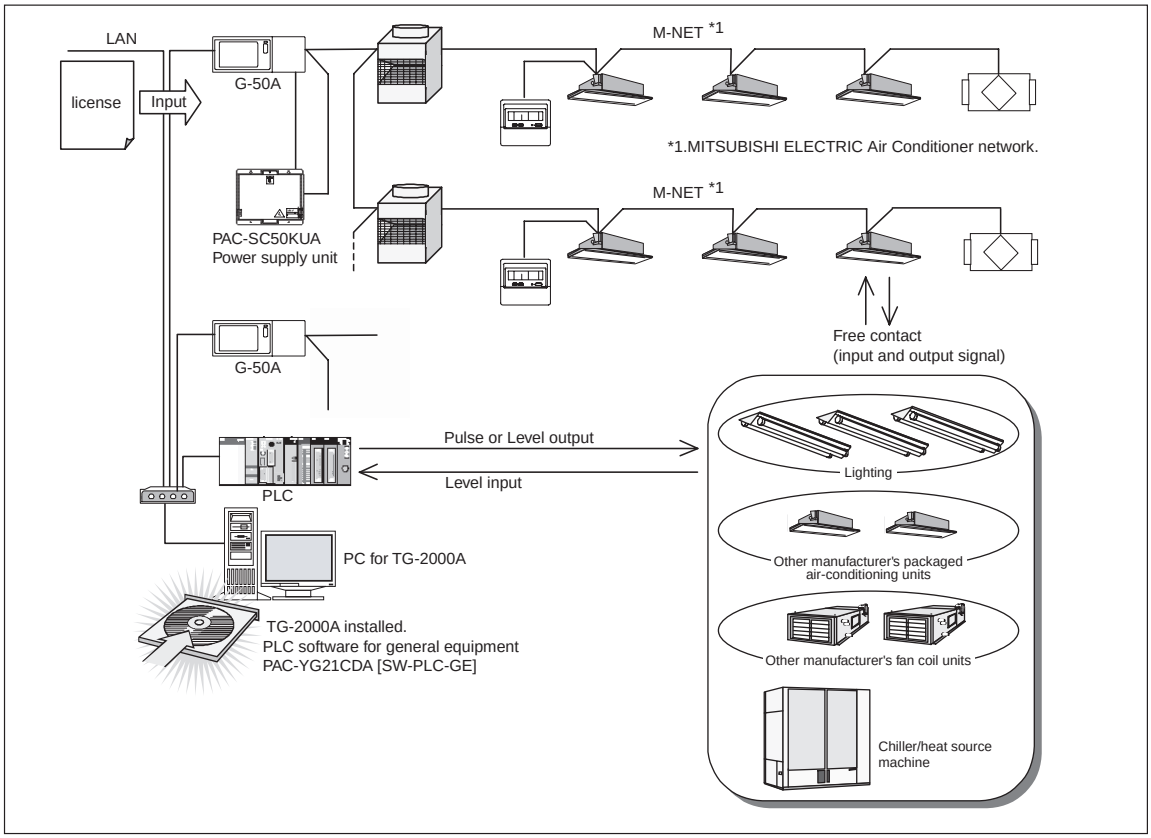
■ Necessary parts for the system

Name (Model name)	Manufacturer	Remarks
PC for central control	PC/AT convertible unit	Confirmed operation of IBM, DELL, Hp Compaq. For details, refer to G-50A Technical Manual.
TG-2000A	MITSUBISHI ELECTRIC	
Charge license	MITSUBISHI ELECTRIC	Requires for each G-50A/GB-50A.
Web monitor license	MITSUBISHI ELECTRIC	Requires for each G-50A/GB-50A.
PLC	MITSUBISHI ELECTRIC	PLC for pulse counting connects maximum 5 sets. For details, refer to Installation Manual of PAC-YG11CDA.
PAC-YG11CDA	MITSUBISHI ELECTRIC	For details, refer to G-50A Technical Manual.
Watt-hour meter with pulse oscillator	MITSUBISHI ELECTRIC	For the specification of the watt-hour meter, refer to G-50A Technical Manual.
Uninterrupted power source (UPS)		Field supplied.

3-9. PLC software for general equipment [PAC-YG21CDA (SW-PLC-GE)]

MITSUBISHI ELECTRIC's Air Conditioner control system can combine control of general equipment like lighting, air conditioners from others, and so on.
Functions on general equipment : On/Off operation, alarm, monitoring, scheduling.

■ System example



■ Necessary parts for the system

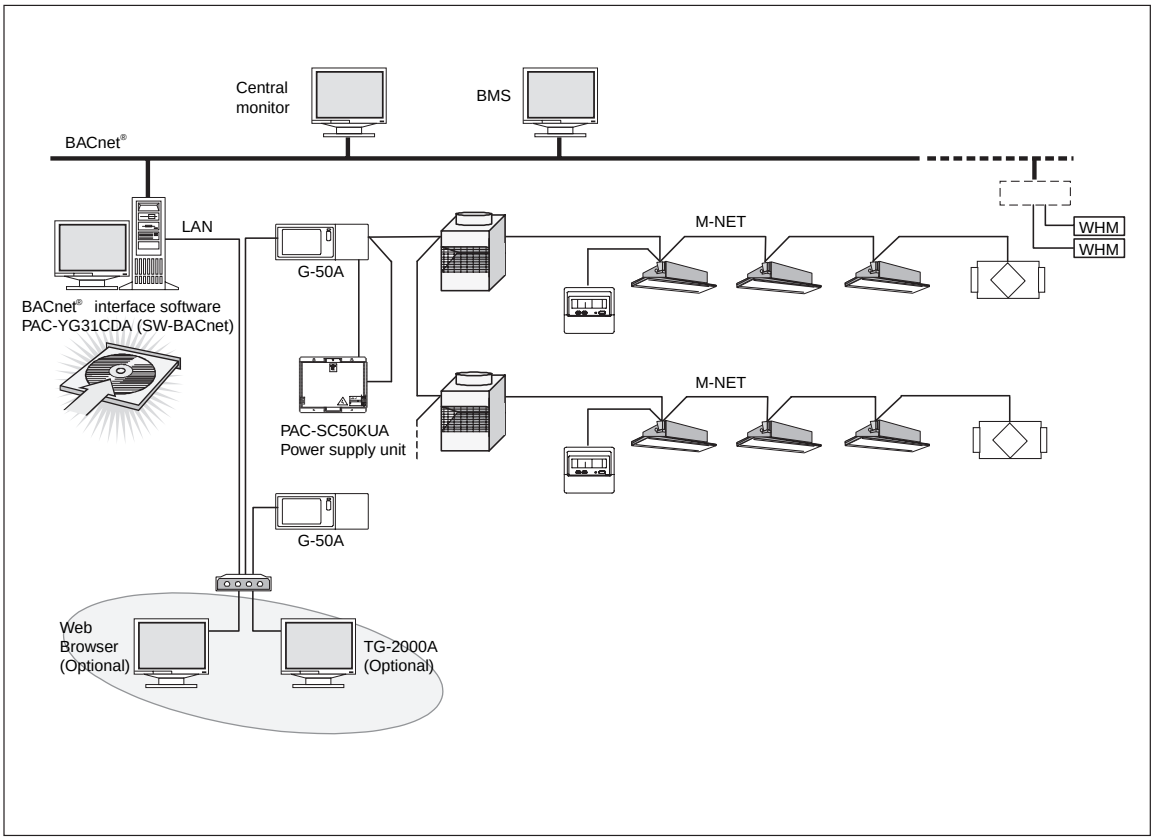
Materials (model names)	Maker	Remarks
PC for central control	PC/AT compatible	Confirmed operation of IBM, DELL, Hp Compaq. For details, refer to G-50A Technical Manual.
TG-2000A	MITSUBISHI ELECTRIC	Use Ver.4.60 or later (Use G-50A's Ver. 2.70 or later)
Web monitor license	MITSUBISHI ELECTRIC	Requires for each G-50A/GB-50A.
PLC for general equipments license	MITSUBISHI ELECTRIC	Table-setting of input/output is necessary.
PLC	MITSUBISHI ELECTRIC	Make sure DI board and DO board are mounted.
PAC-YG21CDA [SW-PLC-GE]	MITSUBISHI ELECTRIC	For details, refer to G-50A Technical Manual.

3-10. BACnet® interface [PAC-YG31CDA] [SW-BACnet]

CITY MULTI® can easily combine into a Building Management System (BMS) via the BACnet® interface software and a PC. BACnet® is an opened transmission protocol widely used at BMS, and related equipment control. CITY MULTI® is therefore compatible with large-scaled BMS management via BACnet®.

One BACnet® interface software and PC serves up to 10 G-50As/GB-50As.

■ System example



Communication items at BACnet® Interface Software PAC-YG31CDA (SW-BACnet)

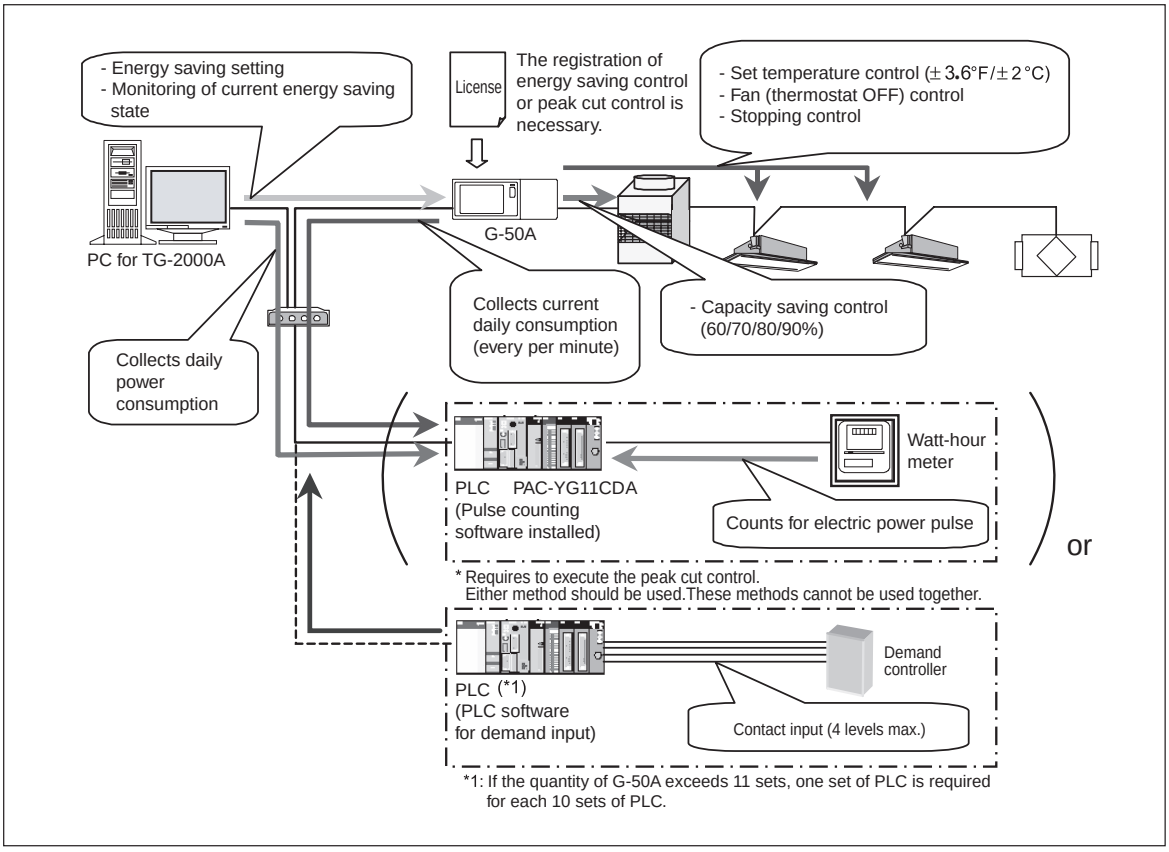
Operation	On/Off Mode Fan speed Air direction Set temp. Filter sign reset Prohibit local On/Off Prohibit local Mode Prohibit local Filter sign reset Prohibit local Set temp. Forced Off	State Monitoring	On/Off Mode Fan speed Air direction Set temp. Filter sign Indoor temperature Prohibit local On/Off Prohibit local Mode Prohibit local Filter sign reset Prohibit local Set temp. Alarm signal Error code Communication state

※ Use a dedicated PC with the BACnet® interface software (PAC-YG31CDA).

3-11. PLC software for demand input [PAC-YG41CDA]

MITSUBISHI ELECTRIC's CITY MULTI® has its intelligent way to carry out peak-cut control while maximizing the air conditioning effect.

■ System example


- Energy saving setting
- Monitoring of current energy saving state
License
The registration of energy saving control or peak cut control is necessary.
- Set temperature control (±3.6°F/±2°C)
- Fan (thermostat OFF) control
- Stopping control
PC for TG-2000A
G-50A
Collects current daily consumption (every per minute)
- Capacity saving control (60/70/80/90%)
Collects daily power consumption
PLC PAC-YG11CDA
(Pulse counting software installed)
Watt-hour meter
Counts for electric power pulse
or
* Requires to execute the peak cut control.
Either method should be used.These methods cannot be used together.
PLC (*1)
(PLC software for demand input)
Demand controller
Contact input (4 levels max.)
*1: If the quantity of G-50A exceeds 11 sets, one set of PLC is required for each 10 sets of PLC.

■ Necessary parts for the system

Name (Model name)	Maker	Remarks
PC for central control	PC/AT convertible unit	Confirmed operation of IBM, DELL, Hp Compaq. For details, refer to G-50A Technical Manual.
TG-2000A	MITSUBISHI ELECTRIC	Use Ver.4.6 or later.
G-50A/GB-50A	MITSUBISHI ELECTRIC	Use Ver.2.6 or later.
Energy saving control (peak cut) license	MITSUBISHI ELECTRIC	Requires for each G-50A/GB-50A.
Web monitor license	MITSUBISHI ELECTRIC	Requires for each G-50A/GB-50A.

3. System controller

Applying the energy saving setting from the integrated centralized control software TG-2000A or Initial setting Web allows conducting the energy saving control by the indoor/outdoor units or peak-cut control by using PLC.

Item		Content
Energy saving control	Indoor unit control	The TG-2000A or Initial setting Web sets the following energy saving items and energy saving time to G-50A/GB-50A per operation block. G-50A/GB-50A conducts energy saving operation to the indoor units with the set detail. ① Temperature control (±3.6°F/±2°C) ② Fan control (Thermostat ON) ③ Stopping control For the block with temperature difference between set and inlet temperature exceeding the set, the energy saving control set at level 0 is not applied.
	Outdoor unit control [2]	The TG-2000A or Initial setting Web sets the following energy saving items and energy saving time to G-50A/GB-50A per outdoor unit and the set G-50A/GB-50A conducts the energy saving operation for the outdoor unit.
Peak cut control	Power consumption monitoring method	Connecting the watt-hour meter (PLC) allows conducting energy saving operation meeting the power consumption. The control object and detail are same as that of the energy saving rotated control. One set of the watt-hour meter can be set for each G-50A/GB-50A.
	Demand controller method	Energy-saving control that is appropriate to the current demand level is performed by receiving the demand level contact signal from the demand controller using the PLC. An installation of demand input PLC software is necessary to use the PLC. Control targets and control content of this method are the same as those of the energy-saving control. Each PLC unit can control up to ten G-50A units to be on the energy-saving control.
Monitoring of energy saving control status/history[1]	Control status	During the energy saving control, the energy saving mark is displayed on the air conditioner group icon of Web, integrated software.
	Daily report	Daily power consumption and control level can be monitored by the integrated software. G-50A/GB-50A can hold the data for 3 days max. including that of today, yesterday and the day before yesterday.
	Monthly report	Monthly power consumption can be monitored by the integrated software (for 62 days max.). The integrated software monitors from PLC for display and storing.

1; Daily Report and Monthly Report are functions that are enabled only when registering the "Energy-saving peak cut control license."TG-2000A must always be kept in operation to gather data on energy-saving control status and the operation history. The auto-output CSV files in the Daily Report and Monthly Report can be saved for two years in the appropriate folders.

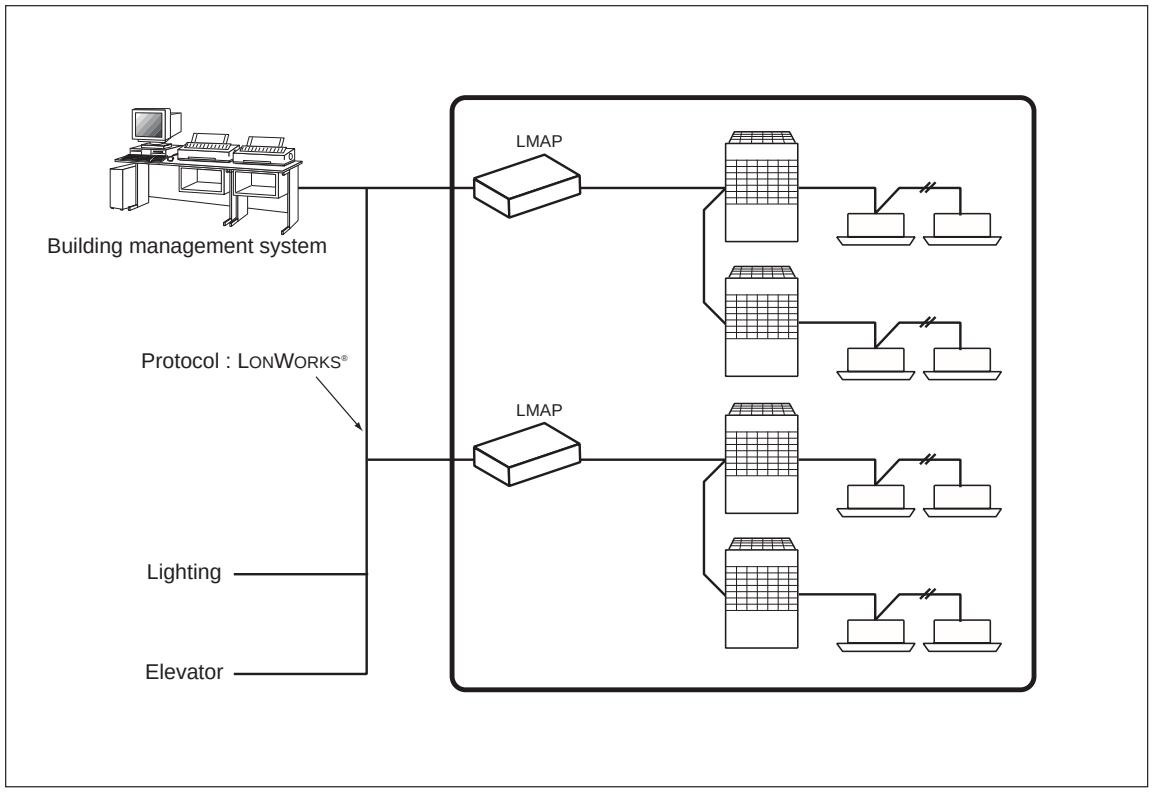
2; For Mr. Slim units, apply Outdoor Unit Control function only to Inverter type units.

3-12. LonWorks® interface [LMAP03U]

CITY MULTI® can easily combine into a Building Management System (BMS) via the LONWORKS® and M-NET adapter LMAP03U. LONWORKS® is an opened transmission protocol widely used at BMS and related equipment control. CITY MULTI® is therefore compatible with large-scaled BMS management via LONWORKS® .

One LMAP03U serves up to 50 indoor units. (CITY MULTI®, Mr. Slim®, and LOSSNAY®.)

■ System example



Communication items at LONWORKS® and M-NET Adapter LMAP03U

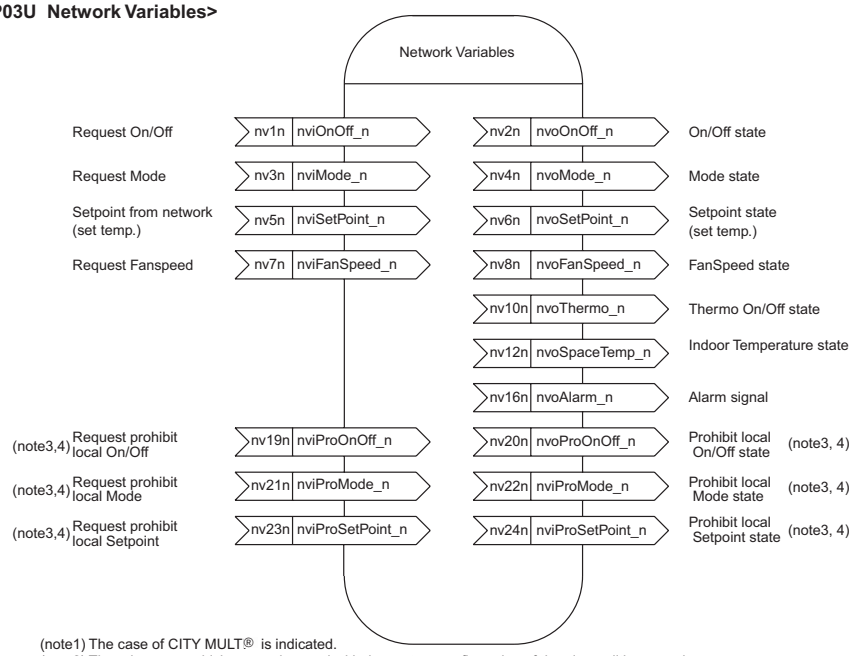
Operation	On/Off Mode Set point from network (Set temp.) Fan speed Prohibit local On/Off Prohibit local Mode Prohibit local Set temp. Batch Off	State Monitoring	On/Off Mode Set point from network (Set temp.) Fan speed Thermo On/Off Indoor temperature Alarm signal Prohibit local On/Off Prohibit local Mode Prohibit local Set temp.

■ Environment specification

Item		Description
Connected Equipment		MITSUBISHI ELECTRIC Multiple split-type air conditioners CITY MULTI® Split-type air conditioners Mr.SLIM® Heat recovery ventilators LOSSNAY® (※For details of the connectable models,please contact the dealer.)
Number of Units		LMAP can control 50 indoor units (Including LOSSNAY®)
Neuron CHIP		TMPN3150 (10MHz)
Network Transceiver		FTT-10A (Free Topology 78kbps)
Performance	Average communication capacity	2.5 inputs/second
	Peak communication capacity	50 inputs/second (for one second)

※ The proper communication is not obtainable when communication intervals exceed its performance, assure sufficient intervals.
※ ACK Service is recommended for the network service.
※ Detailed specifications for the LONWORKS network can be found in " FTT-10A Free Topology Transceiver User's Guide " by Echelon Corporation.

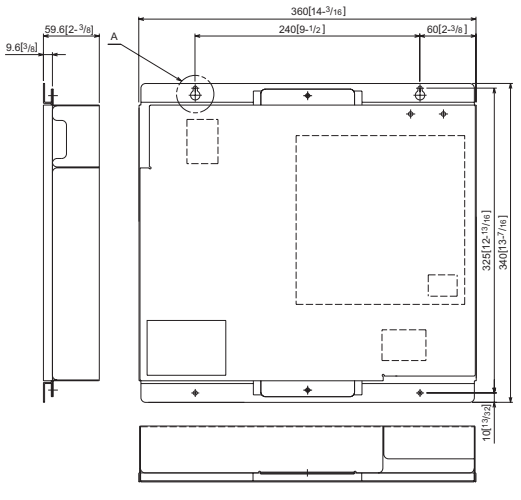
<LMAP03U Network Variables>



(note1) The case of CITY MULT® is indicated.
(note2) There is a case which cannot be used with the system configuration of the air conditioners units.
(note3) "n" of the network variable shows indoor unit address (M-NET).
(note4) It is possible to use when the "MA" remote controller.

■ External dimension

Unit:mm[in.]

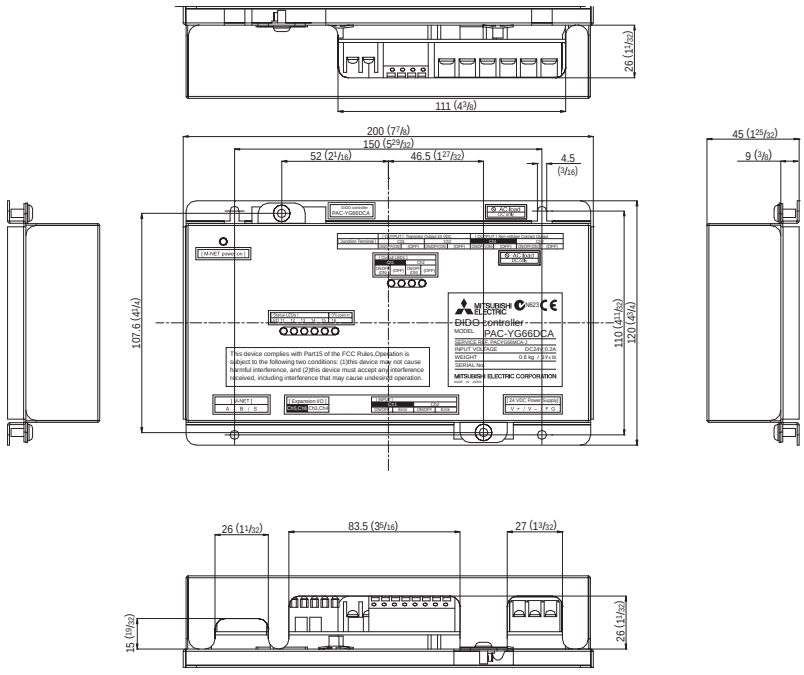


Item			Description
Dimensions			340 (H) x 360 (W) x 59.6 (D) [13-7/16(H) x 14-3/16 (W) x 2-3/8(D)]
Net Weight			3.4 kg (7-1/2 lb)
Power Source			~ 208 - 230V (60 Hz)
Current Consumption			50 mA (Maximum)
Operation Environment	Temperature	Operating Range	-15 to 43°C / 5 to 109°F
		Storage Range	-20 to 60°C / -4 to 140°F
	Humidity		30 to 95 RH (No condensation)
Installation Environment			In the control box

3-13. DIDO controller [PAC-YG66DCA]

The DIDO controller is used in combination with a G(B)-50A to operate general-purpose equipment, as well as to monitor operating and error status. It is equipped with two sets of standard terminals (Channels 1 and 2), and four sets of expansion connectors for the input/output terminals. Expansion cable is optional.
Other devices can only be controlled from G(B)-50A Web browser and TG-2000A. Operation cannot be monitored or performed from the G-50A LCD.
In addition, this device includes a function that interlocks M-NET devices such as indoor units, general equipment, etc.

■External Dimensions



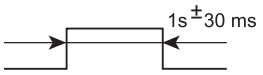
Unit: mm (in)

⚠CAUTION

Usage Restrictions
- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.
  Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment, and replacement.
- Do not use this device in disaster prevention, security, or "critical to life" applications.
- It is recommended to provide an external switch for general-purpose equipment in case of a failure of the DIDO controller or a peripheral part.

3-13-1. Specifications

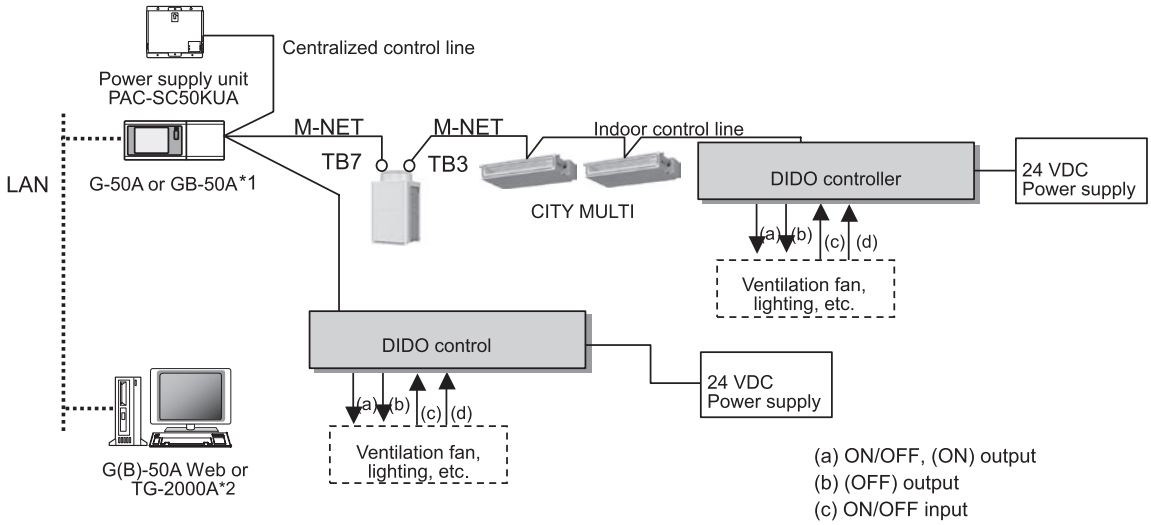
3-13-1-1. Device Specifications

<table>
<tr><th>Item</th><th colspan="6">Rating and Specification</th></tr>
<tr><td>Power Supply</td><td colspan="5">24 VDC ±10%: 5 W (*1)</td><td>Screw terminal block (M3) (*8)</td></tr>
<tr><td rowspan="9">Interface</td><td colspan="3">M-NET communication</td><td colspan="2">17 to 30 VDC (*2)</td><td>Screw terminal block (M3) (*8)</td></tr>
<tr><td rowspan="4">Standard</td><td rowspan="3">Output (*3)</td><td rowspan="2">ON/OFF, (ON) (*4)</td><td>Non-voltage Relay contact (2)</td><td>Applied load
MAX: 24 VDC, 5 W
MIN: 5 VDC, 2 mW
* AC loads cannot be connected.</td><td>Screw terminal block (M3.5) (*8)</td></tr>
<tr><td>Transistor (2)</td><td>24 VDC 40 mA or less (*5)</td><td>Screwless terminal block</td></tr>
<tr><td rowspan="2">(OFF) (*4)</td><td>Non-voltage Relay contact (2)</td><td>Applied load
MAX: 24 VDC, 5 W
MIN: 5 VDC, 2 mW
* AC loads cannot be connected.</td><td>Screw terminal block (M3.5) (*8)</td></tr>
<tr><td>Transistor (2)</td><td>24 VDC 40 mA or less (*5)</td><td>Screwless terminal block</td></tr>
<tr><td>Input</td><td>ON/OFF
Error/Normal</td><td>Non-voltage a contact (2 each)</td><td>24 VDC 1 mA or less (*6)</td><td>Screwless terminal block</td></tr>
<tr><td rowspan="4">Expansion</td><td rowspan="2">Output</td><td>ON/OFF, (ON) (*4)</td><td rowspan="2">Transistor (4 each)</td><td rowspan="2">24 VDC 40 mA or less (*5)</td><td rowspan="2">9 pin connector</td></tr>
<tr><td>(OFF) (*4)</td></tr>
<tr><td rowspan="2">Input</td><td>ON/OFF
Error/Normal</td><td>24 VDC input (4 each)</td><td>24 VDC 1 mA or less (*7)</td><td>9 pin connector</td></tr>
<tr><td colspan="3">Output Pulse Width</td><td>1s ± 30 ms</td><td colspan="2">  </td></tr>
<tr><td>Interlock Function</td><td colspan="6">Interlock M-NET devices and output contacts according to status of input contacts. (*8)</td></tr>
<tr><td rowspan="3">Environment Conditions</td><td colspan="2" rowspan="2">Temperature</td><td>Operating temperature range</td><td colspan="2">0 to 40°C [32°F to 104°F]</td></tr>
<tr><td>Storage temperature range</td><td colspan="2">-20 to 60°C [-4°F to 140°F]</td></tr>
<tr><td colspan="2">Humidity</td><td colspan="3">30 to 90%RH (no condensation)</td></tr>
<tr><td>Dimensions</td><td colspan="6">200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in</td></tr>
<tr><td>Weight</td><td colspan="6">0.6 kg / 1 3/8 lb</td></tr>
<tr><td>Time Backup During Power Failure</td><td colspan="6">In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)</td></tr>
<tr><td>Installation Environment</td><td colspan="6">Inside a control panel (indoors)
* Use this product in a hotel, a business office environment or similar environment.</td></tr>
</table>

*1: For details, refer to "3-13-1-2. Parts Purchased Separately".
*2: Supply electric power from a power unit for the transmission line or an outdoor unit.
Furthermore, the power consumption factor of the M-NET circuitry of this device is "1/4" (equivalent to one ME Remote Controller).
*3: Non-voltage Relay contact or transistor is available for output. Only one can be used at a time.
*4: ( ) is in the case of a pulse.
*5: The output is open collector type. Power must be supplied from an external power source to the output circuit of this device.
*6: Power is supplied from this device to the external contacts.
*7: Power must be supplied from an external power source.
*8: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread).
The number indicates the screw diameter (mm).

3-13-1. Specifications

3-13-1-1. Device Specifications



(a) ON/OFF, (ON) output
(b) (OFF) output
(c) ON/OFF input
(d) Error/Normal input
Standard: Terminal block (for 2 units)
Expansion: Connectors (for 4 units)
Total: 6 units

* This figure omits the power supply line and only shows the transmission line.

*1: The DIDO controller can be connected to G(B)-50A with Ver.3.20 or later.
*2: The DIDO controller can be connected to TG-2000A with Ver.5.10 or later.

<Restrictions>
Maximum of 50 units (50 channels) per G(B)-50A
However, the number of units that can be connected to a G(B)-50A is up to 50 including the number of contacts used on this device, an indoor unit, LOSSNAY unit, etc.
Up to 6 contacts can be connected to the DIDO controller (1 M-NET address). One contact connected to this device is calculated as the equivalent of one indoor unit connected to G(B)-50A.
For example, 5 contacts connected to the DIDO controller are calculated as the equivalent of 5 indoor units connected to G(B)-50A.

NOTE

- For the shield ground of the M-NET centralized control line, use single-point grounding at the power unit for the transmission line.
  However, when supplying electric power to the M-NET centralized control line from the R410A series outdoor unit without using a power supply unit for the transmission line, use single-point grounding at the TB7 of that outdoor unit.
  Furthermore, when connecting this device to the M-NET indoor control line, use grounding at the TB3 for each outdoor unit system.
- If the M-NET transmission line of this device is connected to the M-NET indoor control line and the outdoor unit is down because, for example, the power supply is interrupted for servicing or there is a failure, the DIDO controller cannot be controlled from the system controller.
- Controlling the system remote controller, ON/OFF remote controller, and schedule timer is only possible with channel 1 of a standard terminal block.
- DIDO controller can only be monitored or performed from G(B)-50A Web browser and TG-2000A. Operation cannot be monitored or performed from the G-50A LCD.
- When G(B)-50A is connected, monitoring control can only be performed from G(B)-50A Web or TG-2000A. Monitoring control cannot be performed from the system remote controller, ON/OFF remote controller or schedule timer.

3-13-1. Specifications

3-13-1-2. Parts Purchased Separately

Prepare the following parts to install this device.

Required Part	Specification
Unit fixing screws	M4 screw × 4 (*M4: ISO metric screw thread)
Power supply for this device	Commercially available power source: 24 VDC±10% 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3) When using transistor output (including extension output) for the 24 VDC output of this device, increase the capacity to match the number used. • 1 set used: 0.3 ADC (Minimum) • 2 sets used: 0.4 ADC (Minimum) • 3 sets used: 0.5 ADC (Minimum) • 4 sets used: 0.6 ADC (Minimum) • 5 sets used: 0.7 ADC (Minimum) • 6 sets used: 0.8 ADC (Minimum) * The increase of the power supply capacity is 0.1 ADC for every set.
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEV Ø1.2 mm to Ø1.6 mm • CVVS 1.25 mm^2 to 2 mm^2 (AWG 16 to 14) * CPEV: PE insulated PVC jacketed shielded communication cable * CVVS: PVC insulated PVC jacketed shielded control cable PE: Polyethylene PVC: Polyvinyl choloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines	Use electric wire of an appropriate size for the terminal block of this device. Electric wire size ···· (1) Solid wire: Ø0.65 mm (AWG21) - Ø1.2 mm (AWG16) (2) Stranded wire: 0.75 mm^2 (AWG18) - 1.25 mm^2 (AWG16) Single strand: At least Ø0.18 mm To use an expansion input/output, use a separately purchased external input/output adapter.

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC50KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.
External I/O adapter	PAC-YG10HA	Connection adapter for using an expansion input/output	This is required when an expansion input/output is used.

[Commercially available parts]

Name	Application	Remark
External 24 VDC power source	Supplies power when to use the DIDO controller or transistor output.	Refer to "Power supply for this device" in "Required Part" above for the power supply capacity.
Relay device	Requires commercially available relay device depending on the electric specifications with an external device.	

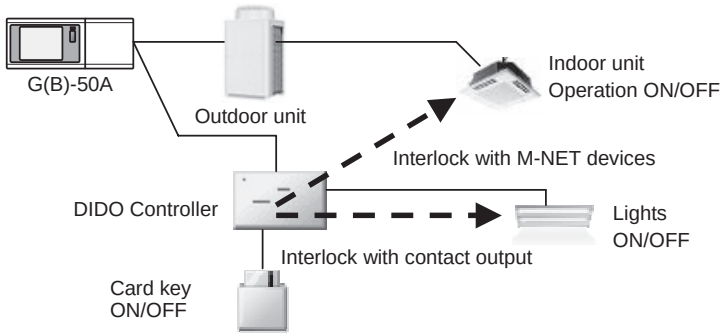
3-13-2. Interlock control

The DIDO controller (PAC-YG66DCA) has an interlock control function, which enables operation or set temperature change on the M-NET devices such as indoor units and also enables signal output to the contacts on the DIDO controller.
Interlock control covers the units connected to the DIDO controller with M-NET system. G-50A must be connected to use the function.
Ask your dealer for interlock control setting. The setting requires special tool support.

⚠CAUTION

Before using the interlock control, you must agree to the following.
1. This feature must not be used for disaster prevention or security purpose.
   (Not designed to be used in situations that are life-threatening)
2. No functions must be added that allow the malfunctioning unit to run by defeating the safety features, such as an external ON/OFF switch or a short-circuit.
3. Those settings for the function that are not supported by the interlocked units must not be made. All the settings must be made within the specified range.
   (Failure to observe these precautions may result in malfunctions and failures.)
4. Perform a test run for interlock control, and confirm the correct settings and normal operation.
5. The system must be configured in the way that integrates the operation of the interlocked fire and emergency control systems.

Item	Content	Remarks
Number of events	24 events	1 event interlock with 1 unit
Determinant condition for interlock control	At input contact change	• Operation input ON/OFF • Error input Error/Normal
Interlock control contents (to be output)	1 action for 1 condition • ON/OFF operation of indoor units • Operation mode change of indoor units • Temperature setting of indoor units • Contact output to DIDO controller (*1)	Interlock control covers the units connected to DIDO controllers with M-NET system. (*1) DIDO controller itself or other DIDO controllers in the same M-NET system.
Other	Interlock control prohibition function is enabled at emergency stop from G(B)-50A	

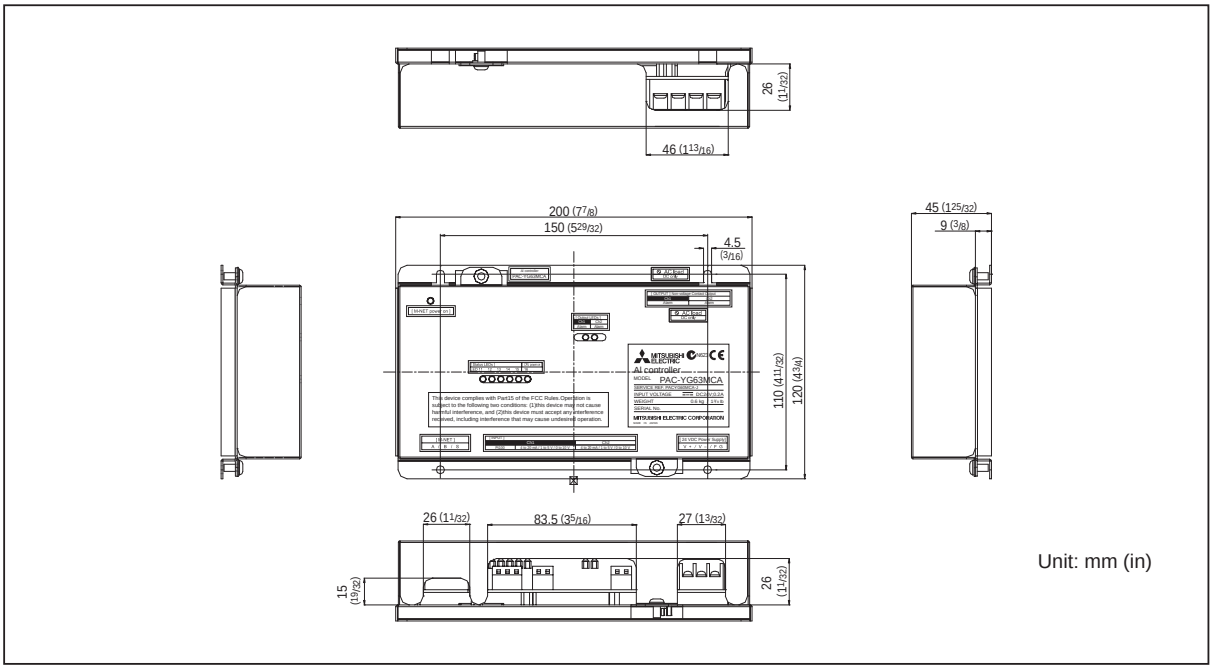


Interlock control of DIDO controller (example)

3-14. AI controller [PAC-YG63MCA]

The AI controller measures temperature and humidity; it also has an alarm capability if the measurement data exceeds defined setpoints.
Historical measurement data can be displayed via only the G(B)-50A Web browser and TG-2000A.
Temperature and humidity cannot be displayed on the G-50A LCD.
Furthermore, an alarm can be output if measurement data exceeds a preset upper or lower limit.
The AI controller also features a function that interlocks M-NET devices for indoor units, etc.

■External Dimensions



Unit: mm (in)

⚠CAUTION

Usage Restrictions
- Mitsubishi Electric does not take financial responsibility for damages caused by issues beyond our control or special circumstances (predicable or unpredictable); and secondary or accidental damages, and damages to other objects. We also do not take financial responsibility for opportunities lost as a result of device failure, or electrical power failure at the end-user site.
  Mitsubishi Electric does not take financial responsibility caused by end-users' requests including, but not limited to, device testing, startup, readjustment and replacement.
- Do not use this device in disaster prevention security or "critical to life" applications.

3-14-1. Specifications

3-14-1-1. Device Specifications

Item	Description						
Power Supply	24 VDC ±10%: 5 W						Screw terminal block (M3) (*5)
Interface	M-NET communication			17 to 30 VDC (*1)			Screw terminal block (M3) (*5)
	Input (*2)	Ch	Sensor	Measurement target	Measurement range	Measurement error	External connection method
		Ch1	Pt100 (3-wire system)	Temperature	-30 to 60°C [-22 to 140°F]	± 0.3%FS ± 0.1°C (0.18°F) (*3) [at 25°C (77°F)]	Screwless terminal block (3 poles)
		Ch1 Analog	4 to 20 mADC / 1 to 5 VDC / 0 to 10 VDC	Temperature/ humidity	(Set by system controller)	± 0.5%FS ± 0.1°C (0.18°F) (*3) ± 0.5%FS ± 0.1%RH [at 25°C (77°F)]	Screwless terminal block (2 poles)
		Ch2 Analog	4 to 20 mADC / 1 to 5 VDC / 0 to 10 VDC	Temperature/ humidity	(Set by system controller)	± 0.5%FS ± 0.1°C (0.18°F) (*3) ± 0.5%FS ± 0.1%RH [at 25°C (77°F)]	Screwless terminal block (2 poles)
	Output	Upper/lower limit alarm interlock output (non-voltage contact)		Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot be connected.			Screw terminal block (M3.5) (*5)
Interlock Function	Interlock M-NET devices according to measurement data values. (*4)						
Environment Conditions	Temperature			Operating temperature range	0 to 40°C [32°F to 104°F]		
				Storage temperature range	-20 to 60°C [-4°F to 140°F]		
	Humidity			30 to 90%RH (no condensation)			
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in						
Weight	0.6 kg / 1 3/8 lb						
Time Backup During Power Failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)						
Installation Environment	Inside a control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.						

*1: Supply electric power from a power supply unit for the transmission line or an outdoor unit. Furthermore, the power consumption factor of the MNET circuitry of this unit is "1/4" (equivalent to one ME Remote Controller).

*2: Configure the dip switch settings for the analog input method to use.

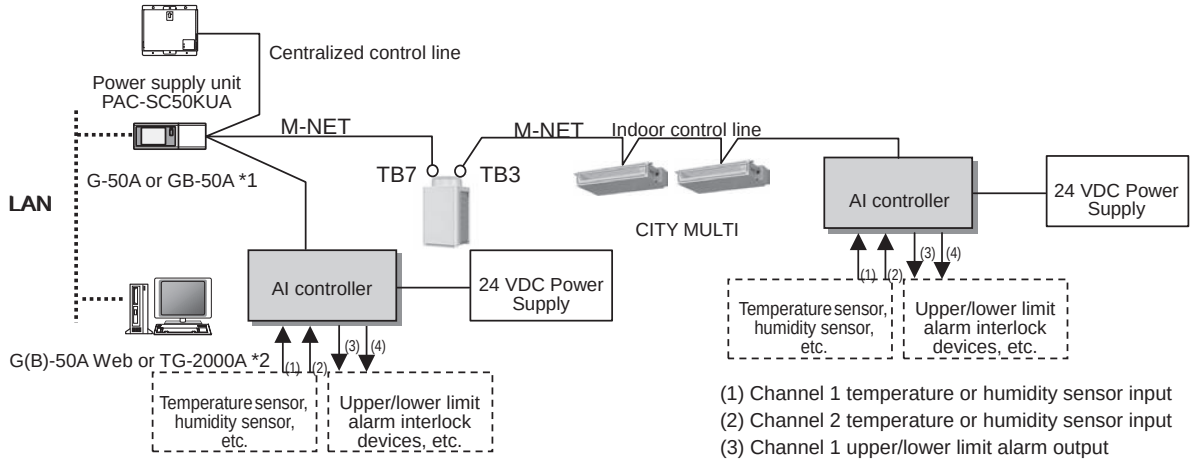
*3: The measurement error for the system includes the measurement error for this unit, sensor, and wiring.
a%FS (full scale) = a% × ([measurement range's upper limit value] - [lower limit value])

*4: Settings for the interlock function are performed from the Maintenance Tool. For details, refer to the operation manual for the Maintenance Tool.

*5: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread). The number indicates the screw diameter (mm).

3-14-1. Specifications

3-14-1-1. Device Specifications



(1) Channel 1 temperature or humidity sensor input
(2) Channel 2 temperature or humidity sensor input
(3) Channel 1 upper/lower limit alarm output
(4) Channel 2 upper/lower limit alarm output

* This figure omits the power supply line and only shows the transmission line.

*1: The AI controller can be connected to G(B)-50A with Ver.3.20 or later.
*2: The AI controller can be connected to TG-2000A with Ver.5.10 or later.

<Restrictions>
Maximum of 50 units per G(B)-50A
However, the number of units that can be connected to a G(B)-50A is up to 50 including this device, an indoor unit, LOSSNAY unit, etc.

NOTE

- For the shield ground of the M-NET centralized control line, use single-point grounding at the power unit for the transmission line.
  However, when supplying electric power to the M-NET centralized control line from the R410A series outdoor unit without using a power supply unit for the transmission line, use single-point grounding at the TB7 of that outdoor unit.
  Furthermore, when connecting the M-NET transmission line of this device to the M-NET indoor control line, use grounding at the TB3 for each outdoor unit system.
- If the M-NET transmission line of this device is connected to an M-NET indoor control line and the outdoor unit is down because, for example, the power supply is interrupted for servicing or there is a failure, the AI controller cannot be set and monitored from the system controller.
- The sensor connected to the AI controller can only be monitored from G(B)-50A Web browser and TG-2000A. The sensor cannot be monitored from the G-50A LCD.

3-14-1. Specifications

3-14-1-2. Parts Purchased Separately

Prepare the following parts to install this device.

Required Part	Specification
Unit fixing screws	M4 screw× 4 (* M4: ISO metric screw thread)
Power supply for this device	Commercially available power source: 24 VDC± 10% 0.2 A (Minimum loading), SELV circuit, power line with grounding terminal Ripple noise: Lower than 200 mVp-p Compatible specification Authorized or CE marked products. Subject to regulations: - IEC60950 (or EN60950) - CISPR22/24 (or EN55022/24) - IEC61000-3-2/3-3 (or EN61000-3-2/3-3)
Power supply for sensors	A separate power supply for sensors may be required. In the case of 24 VDC voltage, the capacity of the power supply for this unit can be increased so that the power supply can be shared.
Power line	Use a sheathed vinyl cord or cable. At least 0.75 mm^2 (AWG18)
M-NET transmission line	Type of the cable: Sheathed vinyl cords or cable which comply with the following specifications or equivalent. • CPEVø 1.2 mm toø 1.6 mm • CVVS 1.25 mm^2 to 2 mm^2 (AWG 16 to 14) * CPEV: PE insulated PVC jacketed shielded communication cable * CVVS: PVC insulated PVC jacketed shielded control cable PE: Polyethylene PVC: Polyvinyl chloride Power needs to be supplied to the M-NET circuitry of this device. Use an outdoor unit or a separately purchased power supply unit for the transmission line.
Signal lines (Sensor input lines)	Shows the size of the electric wire (copper wire) that is adapted to the terminal block of this device. Refer to the usage and cautionary items of the sensor when performing settings. However, use a line with shielded line. Electric wire size ···· (1)Solid wire:ø 0.65 mm (AWG21) -ø 1.2 mm (AWG16) (2)Stranded wire: 0.75 mm^2 (AWG18) - 1.25 mm^2 (AWG16) Single strand: At leastø 0.18 mm

[Parts to be Purchased Separately]

Name	Model	Application	Remark
Power supply unit	PAC-SC50KUA	Power supply to the M-NET transmission line	This is not required when power is to be supplied from an outdoor unit.

[Commercially available parts]

Part	Use	Remark
External 24 VDC power source	Supplies power to the AI controller.	Refer to "Power supply for this device" and "Power supply for sensors" in "Required Part" above for the capacity of the power supply.
Sensor	Measures temperature and humidity.	Temperature sensor (PAC-SE40TSA) cannot be connected.

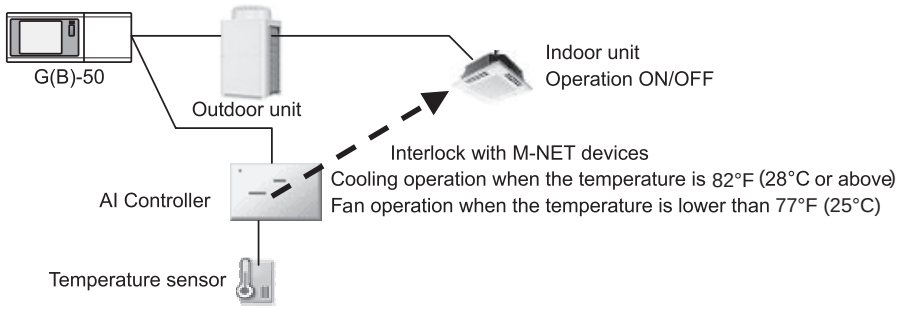
3.14-2. Interlock control

AI controller (PAC-YG63MCA) has an interlock control function, which enables operation or set temperature change on the M-NET devices such as indoor units.
Interlock control covers the units connected to the AI controller with M-NET system. G-50A must be connected to use the function.
Ask your dealer for interlock control setting. The setting requires special tool support.

⚠CAUTION

Before using the interlock control, you must agree to the following.
1. This feature must not be used for disaster prevention or security purpose.
   (Not designed to be used in situations that are life-threatening)
2. No functions must be added that allow the malfunctioning unit to run by defeating the safety features, such as an external ON/OFF switch or a short-circuit.
3. Those settings for the function that are not supported by the interlocked units must not be made. All the settings must be made within the specified range.
   (Failure to observe these precautions may result in malfunctions and failures.)
4. Perform a test run for interlock control, and confirm the correct settings and normal operation.
5. The system must be configured in the way that integrates the operation of the interlocked fire and emergency control systems.

Item	Content	Remarks
Number of events	24 events	1 event interlock with 1 unit
Determinant condition for interlock control	Measurement value Measurement interval is 1 to 7200 seconds.	• Exceeding measurement value in setting range • Exceeding upper/lower limit alarm detection value and cancellation value
Interlock control contents (to be output)	1 action for 1 condition • ON/OFF operation of indoor units • Operation mode change of indoor units • Temperature setting of indoor units • Contact output to DIDO controller	Interlock control covers the units connected to AI controllers with M-NET system.
Other	Interlock control prohibition function is enabled at emergency stop from G(B)-50A	



Interlock control of AI controller (example)

In a multi air conditioner system that is a free plan direct-expansion type, a connector for inputting and outputting signals to/from the outside is fitted as standard on the control board of the indoor, outdoor, and water-source units. Use this when you want each unit to input/output signals individually. (Note: When ther are many control units, it is recommended that you use MELANS. This would enable you to save on labor.) In order to have an input output signal from each connector, you must have a dedicated adapter (sold separately) and a relay circuit (on-site arrangements).
Note : See next page for actual examples of use.

■ Types of control that uses connectors for the outdoor unit / water-source unit input output signal (connection for each type of option).

Category	Application	Function	Connector	
			Y, WY	R2, WR2
Input	Method of disabling cool and heat operation (thermo off) by input from the outside to the outdoor unit (water-source unit).	Comp ON/OFF	CN3S	CN3D
	The low noise operation of the indoor unit can be commenced by the external input to the outdoor unit (water-source unit). (The night mode can be adapted only under the outdoor temperature condition of 30°C [87°F] or less for cooling and 3°C [37°F] or more for heating)	Night mode	CN3D	CN3D
	You can switch the operation mode between cooling and heating by input from the outside to the outdoor unit (water-source unit).	System changeover		—
	Forces the heat source unit to stop operation by receiving contact signals from the pump interlock circuit	Pump Interlock signal input (level)	TB8	TB8
Output	Method of receiving a signal from the outdoor unit (water-source unit) to the outside. ✻ Can be used as a device that displays the operation state. ✻ Can be used as an interlocked control with external equipment.	Compressor is run state	CN51	CN51
		Error state or frost prevention output (note 8)		
		Operation ON signal (note 9)	TB8	TB8

■ Types of control that uses connectors for the indoor unit input output signal (connection for each type of option)

Category	Application	Function	Connector
Input (Note 2,3)	Method of ON/OFF control by turning on and off switches or contacts from an outside to each indoor unit group. Can be used as a timer adapter (Note 1) Can be used as a "forget to switch off prevention" or "forced stop".	Distant/local switching (note 1)	CN32
		ON/OFF (level)	
	Method of ON/OFF control by inverting start/stop using external pulse (a-contact) for each indoor unit group.	ON/OFF (pulse)	CN51
Output	Method of sending signals to outside for each indoor unit group. It can be used as a device to display operation states. It can be used as an interlocked control with the external equipment.	Operation state	CN51
		Error state	
		Operation mode (heat) state	CN52
		Operation mode (cool, dry) state	
		Thermo ON (fan) state	

CONTROLLER

Note 1: Connect the signal input only to the principal unit in a group.
(However, the demand input is required to enter into indoor units individually.)
Note 2: When using start/stop input at group operation, Local remote controller is necessary.
(MA remote controller or M-NET remote controller)
Note 3: When setting to Remote, operation can not be performed from Local remote controller.
The remote controller displays [CENTRAL] / [CENTRALLY CONTROLLED] / [ ].
Note 4: When using start/stop input at group operation, [Automatic address start-up] can not be performed.
Note 5: When CN51 or CN52 is commonly used as an output signal, be sure to use the remote display kit.
Note 6: The remote display kit can be used for the input signal of CN51 and CN52.
Note 7: Connect to the principal unit only when using [Operating status] or [Operation mode (Heating/Cooling-Dry) of signal output. Connect to indoor units individually when using [Error status] or [Thermostat ON (or fan) status]
Note 8: The error state of the water-source unit can be output when Dip SW3-3 is OFF
When Dip SW3-3 is ON, the signal is output only when the water-source unit is stopped and the water temperature (TH6) is 5°C[41°F] or lower.
Note 9: When Dip SW2-7 is OFF, the operation ON signal is output only when the compressor is in operation.
When Dip SW2-7 is ON, the signal is output when cooling or heating operation signal from the controller is received. (The signal is kept active even if the compressor stops due to thermo OFF.)

It is possible to have ON/OFF control by turning the indoor unit power on and off. You can select functions by setting the DipSW1-9 and 1-10 on the indoor unit.

■ Types of ON/OFF control (indoor unit settings)

It is possible to have ON/OFF control for each indoor unit (or group) by dip switches 9 and 10 (SW1-9, SW1-10) of the indoor unit.

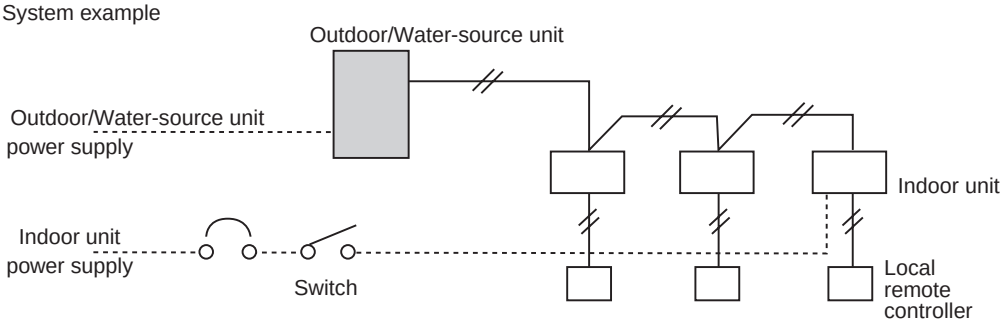
Function	Operation when indoor unit recovers	Setting SW 2 (note 1)	
		9	10
All auto restart	All indoor units will always restart regardless of the state that was before the power was turned off (POWER OFF) (after 5 minutes).	OFF	ON
Auto recovery	Indoor units which are operated before the power was turned off (POWER OFF) will restart (after 5 minutes).	ON	OFF
All OFF	Operation stays stopped regardless of the state that was before the power was turned off.	OFF	OFF

Note 1. The dip switch setting for all units in the indoor unit group is required.
Note 2. Do not cut-off the power to the outdoor/water-source unit. If you do, it will disconnect the power to the crankcase heater of the outdoor/water-source unit and that could cause damage to the compressor
Note 3. This cannot be applied to the power ON/OFF of the drain pump and humidifier equipment.

■ Description of when using distant/local switching (CN32)

SW1 Local switching	SW2 ON/OFF	State	Remote controller display/operation
OFF	OFF	Local / Permit	The operation permit
ON	OFF	Distant / Stop	It displays "CENTRALLY CONTROLLED", while the state is distant. It prohibits ON/OFF operation of remote controller.
ON	ON	Distant / Operate	

■ System example



When the power to the outdoor/water-source unit is cut-off for a long time, the compressor crankcase heater also stops. If the compressor is started soon after the power is restored, there is a chance that a fault will occur in the compressor When using the above function, make sure the power to the outdoor/water-source units will not be cut-off.

■ Limitations to combining system controls

	Description		Control combining distant/local	Pulse ON/OFF	Power ON/OFF	Automatic recover
1	Control combining distant/local	CN32	—	×※1	×※1	×※1
2	Pulse ON/OFF	CN51		—	○	○
3	HA ON/OFF (JEMA)	CN51			○	○
4	Power ON/OFF	-			—	×
5	Automatic recover	-				—

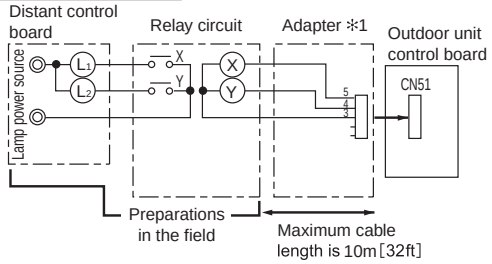
※1: Pulse ON/OFF, Power ON/OFF and automatic recover can only be used when the distant/local setting (CN32) is set to local. Therefore, always avoid this function when combining control.

4-1. Outdoor unit (Water-source unit) input/output connector

4-1-1. PUHY-P-TGMU, PQHY-P-TGMU PURY-P-TGMU, PQRY-P-TGMU

⚠ Caution:
1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have have 2750V or more.

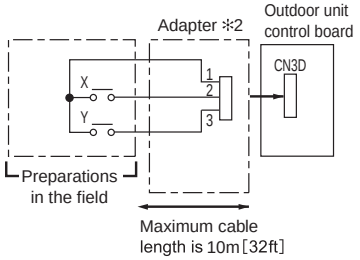
CN51 State



L1 : Outdoor unit error display lamp
L2 : Compressor operation lamp (compressor running state)
X, Y : Relay (Coil with fixed DC12V, a power consumption of 0.9W or less)

✻1. Optional part : PAC-725AD or field supply.

CN3D Step demand and Night mode



DipSW4-7 : ON (Step demand)

		X	
		OPEN	SHORT
Y	OPEN	100%	75%
	SHORT	0%	50%

✻They are rough values.

DipSW4-7 : OFF (Compressor ON/OFF and Night mode)

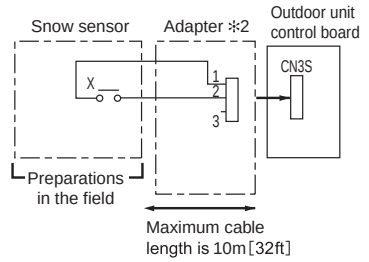
Y	Compressor ON/OFF
OPEN	ON
SHORT	OFF

X	Night mode
OPEN	OFF
SHORT	ON

X, Y : Relay (Coil with fixed DC12V, a power consumption of 0.9W or less)

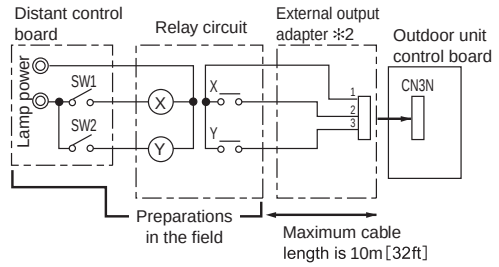
✻2. Optional part : PAC-SC36NA or field supply.

CN3S Snow sensor



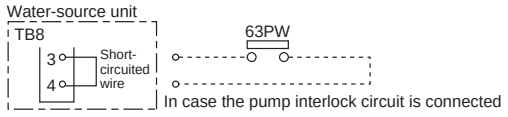
X : Relay (Contact : minimum applied load DC12V 1mA)
Snow sensor : The outdoor fun runs when X is closed in stop mode or thermostat mode.

CN3N System changeover (PUHY, PQHY only)



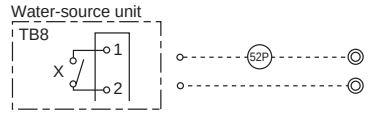
SW1 : Cooling / Heating
SW2 : Validity / Invalidity of SW1
X, Y : Relay (Contact : minimum applied load DC12V 1mA)

TB8 (PQHY, PQRY only)



When connecting the pump interlock circuit to terminals 3 and 4 on TB8, remove the short-circuited wire.
63PW : Flow or differential pressure switch (Contact: Minimum applied load 5mA)

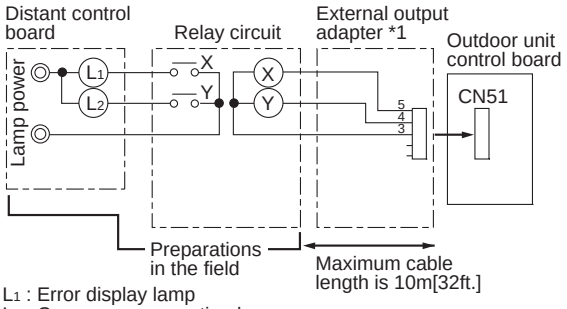
TB8 (PQHY, PQRY only)



X : Relay (Contact rating AC200V 1A)
52P : Pump contactor

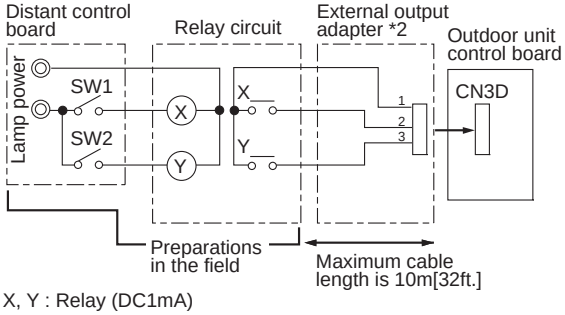
4-1-2. PUMY-P-NHMU

CN51 State



L1 : Error display lamp
L2 : Compressor operation lamp
X, Y : Relay (Coil standard of 0.9W or less for DC 12V)

CN3D Silent Mode / Demand Control

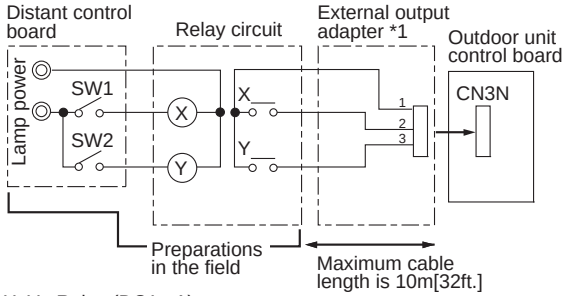


X, Y : Relay (DC1mA)

The silent mode and the demand control are selected by switching the Dip switch 8-1 on outdoor controller board.
It is possible to set it to the following power sonsumption (compared with ratings) by setting SW1,2

	Outdoor controller board DIP SW8-1	SW1	SW2	Function
Silent mode	OFF	ON	—	Silent mode operation
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

CN3N System Changeover



X, Y : Relay (DC1mA)

	ON	OFF
SW1	Heating	Cooling
SW2	Validity of SW1	Invalidity of SW1

*1 Optional part: PAC-725AD or field supply.
*2 Optional part: PAC-SC36NA or field supply.

4-2. Indoor unit "-E" type input/output connector

● ON/OFF (Pulse) input specification

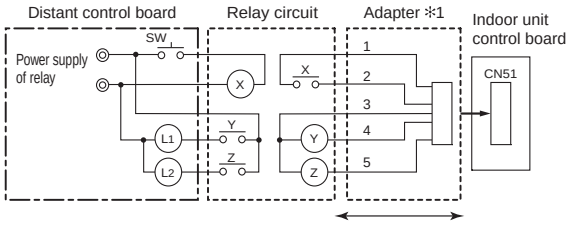
Item	Description
Input signal	Pulse sign (a connect)
Standard of pulse	200msec or more

⚠ Caution:
1. Wiring should be covered by insulation tube with supplementary insulation.
2. Use relays or switches with IEC or equivalent standard.
3. The electric strength between accessible parts and control circuit should have have 2750V or more.

CONTROLLER

● Input

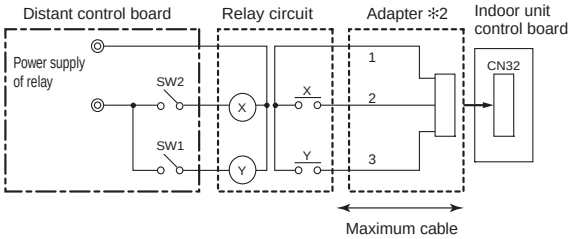
CN51



SW : Distant ON/OFF switch
L1 : Status lamp
L2 : Error lamp
X : Relay (Contact : minimum applied load DC12V 1mA)
Y, Z : Relay (Contact : minimum applied load DC12V 1mA)

※ Every time the SW is pushed (the pulse is inputted), it reacts against ON/OFF.

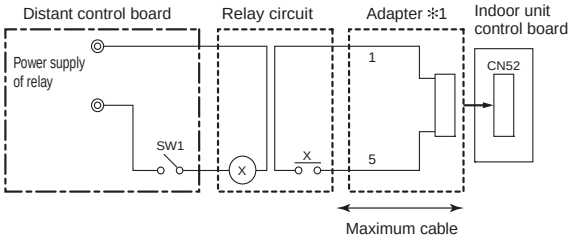
CN32



SW1 : Distant/Local switching
SW2 : ON/OFF switch
X, Y : Relay (Contact : minimum applied load DC5V 1mA)

※ SW2 is available when SW1 is ON.

CN52

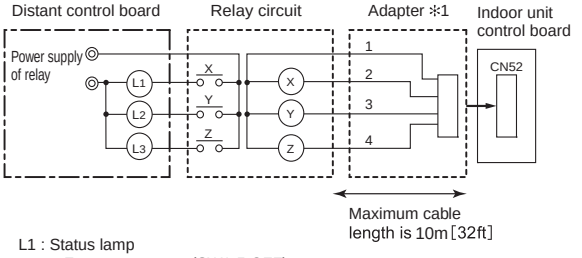


SW1 : Demand switch
X : Relay (Contact : minimum applied load DC12V 1mA)

SW1	Indoor unit
ON	Forced thermo-OFF
OFF	Normal running

● Output

CN52



L1 : Status lamp
Fan motor output (SW1-5 OFF)
Thermostat ON (SW1-5 ON)
L2 : Cooling/Dry status lamp
L3 : Heating status lamp
X, Y, Z : Relay (Contact : minimum applied load DC12V 1mA)

※1 Optional part : PAC-725AD or field supply
※2 Optional part : PAC-715AD or field supply